This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

B 434784

PRESENTED TO
THE LIBRARY
OF THE
UNIVERSITY OF MICHIGAN
By Mrs. J. D. Baldwin
Nov. 2, 1891

SB
1
.A48

38275-

TRANSACTIONS

OF THE

American Horticultural Society,

FOR THE YEAR 1886,

:NG, HELD AT
, 1886,

SSIONS; ALSO, LIST OF
L SOCIETIES,
ERS.

Compliments of

W. H. RAGAN,

Sec'y American Hort. Society,

GREENCASTLE, IND.

Please acknowledge.

VOL. IV.

BY W. H. RAGAN, SECRETARY,
Greencastle, Indiana.

INDIANAPOLIS:
CARLON & HOLLENBECK, PRINTERS AND BINDERS.
1886.

TRANSACTIONS

38275-

OF THE

American Horticultural Society,

FOR THE YEAR 1886,

BEING A REPORT OF THE SEVENTH ANNUAL MEETING, HELD AT CLEVELAND, OHIO, SEPTEMBER 7TH TO 10TH, 1886,

TOGETHER WITH

A FULL LIST OF PAPERS READ, WITH ACCOMPANYING DISCUSSIONS; ALSO, LIST OF MEMBERS, ROSTER OF OFFICERS OF HORTICULTURAL SOCIETIES, PRESS DIRECTORY AND SUPPLEMENTAL PAPERS.

VOL. IV.

BY W. H. RAGAN, SECRETARY.
Greencastle, Indiana.

INDIANAPOLIS:
CARLON & HOLLENBECK, PRINTERS AND BINDERS.
1886.

TABLE OF CONTENTS.

Officers for 1886–7 7
Standing Committees 8
Correspondents 10
Constitution of the Society 5
List of Members for 1886–87 13
Proceedings of the Seventh Annual Meeting 25
Letters from Absent Friends 26
Secretary's Report (*Ragan*) 36
Past, Present and Future of Grape Growing in California (*Husmann*) 37
Notes from the Extreme South (*Hart*) 48
Address of Welcome (*Gardener*) 52
President's Address (*Earle*) 53
Is the Vegetable Kingdom as Senseless as the Rocks? (*Green*) 64
How Shall We Protect our Crops in Time of Drouth? (*Smith*) 67
Vegetables in Japan (*Tamari*) 77
Transplanting in Theory and Practice (*Greiner*) 82
Nut Culture in the North for Pleasure and Profit (*Lovett*) 85
Small Fruits in New England (*Hale*) 90
American Horticultural Organizations (*Kingsbury*) 100
Pomology a Division of the Department of Agriculture (*Van Deman*) 109
The Press and Horticulture (*Myrick*) 114
Protection of Railway Tracks from Snow Drifts (*Doppelmair*) 120
Fruit Growing in the Northwest (*Harris*) 130
Better Culture of Grape Vines (*Campbell*) 134
Horticulture in Mississippi (*McKay*) 139
Horticulture in the Mountain Regions of the South (*Hape*) 142
Selling Fruits by Auction (*Corsa*) 145
Orchard Rusts (*Seymour*) 152
Profitable Horticulture (*Allen*) 160
Relative hardiness of Seedlings and Grafts (*Brackett*) 179
What and Where Shall We Plant? (*Hammond*) 182
Olive Culture in California (*Kimball*) 185
Excursion to Euclid (*Ragan*) 195
Unification of Horticultural Societies (*Secretary*) 211

CONSTITUTION

OF THE

AMERICAN HORTICULTURAL SOCIETY.

ARTICLE I. The organization shall be known as the American Horticultural Society. Its object shall be the promotion of horticulture.

ARTICLE II. Any person may become a member upon the payment of two dollars, and membership shall continue upon the payment of two dollars annually.

ARTICLE III. Its officers shall consist of a President, First Vice-President, Secretary and Treasurer, and one Vice-President from each State, who shall be elected by ballot at each annual meeting. The term of office of the President, Vice-President, Secretary and Treasurer shall begin on the first day of July following their election. No person can act as an officer of this Society who does not maintain his membership by the payment of the annual membership fee.

ARTICLE IV. The regular meetings of this Society shall be held annually on the first Tuesday of September, except when otherwise ordered by the Executive Committee, and continue for such time as the committee shall determine.

ARTICLE V. The officers of the Society shall constitute an Executive Committee, at any meeting of which a majority of the members present shall have power to transact business.

ARTICLE VI. Special meetings of the Society may be called by the Executive Committee, and meetings of the committee may be called by the President and Secretary.

ARTICLE VII. This Constitution may be amended by a two-thirds vote of the members present at any regular meeting.

OFFICERS

OF THE

AMERICAN HORTICULTURAL SOCIETY

FOR 1886–87.

PARKER EARLE, PRESIDENT ..... Cobden, Illinois.
T. V. MUNSON, FIRST VICE-PRESIDENT ..... Denison, Texas.
W. H. RAGAN, SECRETARY ..... Greencastle, Indiana.
J. C. EVANS, TREASURER ..... Harlem, Missouri.

STATE VICE-PRESIDENTS.

Alabama	W. F. HEIKES	Huntsville.
Arizona		
Arkansas	W. K. TIPTON	Little Rock.
California	PROF. E. W. HILGARD	Berkeley.
Colorado	D. S. GRIMES	Denver.
Connecticut	P. M. AUGUR	Middlefield.
Dakota	E. M. FULLER	Bismarck.
Delaware	W. P. CORSA	Milford.
District of Columbia	HON. NORMAN J. COLMAN	Washington.
Florida	EDMUND H. HART	Federal Point.
Georgia	DR. SAMUEL HAPE	Atlanta.
Idaho	GEO. L. SHOUP	Salmon City.
Illinois	PROF. T. J. BURRILL	Champaign.
Indiana	C. M. HOBBS	Bridgeport.
Indian Territory		
Iowa	PROF. J. L. BUDD	Ames.
Kansas	F. WELLHOUSE	Fairmount.
Kentucky	A. D. WEBB	Bowling Green.
Louisiana	JOHN T. HARDIE	New Orleans.
Maine	SAM'L L. BOARDMAN	Augusta.
Manitoba		
Maryland	FRANKLIN DAVIS	Baltimore.

Massachusetts	W. C. Strong	Brighton.
Michigan	T. T. Lyon	South Haven.
Minnesota	J. S. Harris	La Crescent.
Mississippi	Dr. H. E. McKay	Madison Station.
Missouri	L. A. Goodman	Westport.
Montana		
Nebraska	Hon. R. W. Furnas	Brownville.
Nevada	Ross Lewers	Franktown.
New Brunswick		
New Hampshire	Chas. H. Payson	Belmont.
New Jersey	John S. Collins	Moorestown.
New Mexico		
New York	S. D. Willard	Geneva.
North Carolina	J. Van. Lindley	Pomona.
Nova Scotia	C. R. H. Starr	Port Williams.
Ohio	N. Ohmer	Dayton.
Ontario	Prof. Wm. Saunders	London.
Oregon	E. W. Allen	Portland.
Pennsylvania	A. W. Harrison	Germantown.
Quebec	Chas. Gibb	Abbottsford.
Rhode Island		
South Carolina	S. C. Satterthwait	Aiken.
Tennessee	C. M. Merwin	Medina.
Texas	J. M. Howell	Dallas.
Utah	Rev. David Peebles	Bountiful.
Vermont	Dr. T. H. Hoskins	Newport.
Virginia	G. F. B. Leighton	Norfolk.
Washington	D. W. Bridgeman	Lone Pine.
West Virginia	George Ort	Charleston.
Wisconsin	J. M. Smith	Green Bay.
Wyoming		

STANDING COMMITTEES.

On Experiment Stations.—Hon. Wm. Saunders of D. C., Prof. W. R. Lazenby of Ohio, Charles W. Garfield of Michigan, Prof. E. W. Hilgard of California, Herbert Myrick of Massachusetts, G. C. Brackett of Kansas, and Hon. P. J. Berkmans of Georgia.

On Schools of Horticulture.—Prof. E. W. Hilgard of California, Hon. R. W. Furnas of Nebraska, N. Ohmer of Ohio, Prof. T. J. Burrill of Illinois, Prof. J. L. Budd of Iowa, Prof. James Troop of Indiana, Prof. A. B. McKay of Miss.

On Societies and Organizations.—T. V. Munson of Texas, W. C. Strong of Mass., S. Barnard of Nebraska, J. M. Smith of Wisconsin, L. A. Goodman of Missouri, C. M. Hobbs of Indiana, and C. L. Watrous of Iowa.

On the Rural Press.—Hon. N. J. Colman of D. C., Herbert Myrick of Mass., Chas. A. Green of New York, Frank H. Leavenworth of Michigan, J. M. Howell of Texas, D. Redmond of Florida, and Tuisco Greiner of New Jersey.

On Botany.—Prof. T. J. Burrill of Illinois, Prof. J. L. Budd of Iowa, T. V. Munson of Texas, C. L. Allen of New York, Prof. S. M. Tracy of Missouri, Frank S. Earle of Illinois, and Dr. A. Schaffranck of Florida.

On Ornithology.—Hon. G. W. Minier of Illinois, J. C. Ratliff of Indiana, E. H. Cushman of Ohio, David Baird of New Jersey, Chas. A. Green of New York, L. A. Goodman of Missouri, and E. W. Allen of Oregon.

On Entomology.—Prof. C. V. Riley of D. C., Prof. Wm. Saunders of Ontario, R. H. Warder of Ohio, D. E. Hoffman of Indiana, J. H. Hale of Connecticut, Robt. Manning of Mass., and Prof. Geo. Husmann of California.

On Fungoid Diseases.—Prof. A. B. Seymour of Mass., Prof. T. J. Burrill of Illinois, Frank S. Earle of Illinois, Prof. J. L. Budd of Iowa, Prof. W. J. Green of Ohio, E. Williams of New Jersey, and E. H. Hart of Florida.

On Pollenization.—Prof. T. J. Burrill of Illinois, Hon. Wm. Parry of New Jersey, Peter Henderson of New York, Prof. J. L. Budd of Iowa, C. M. Merwin of Tennessee, Prof. Geo. Husmann of California, and T. V. Munson of Texas.

On Meteorology.—Hon. R. W. Furnas of Nebraska, D. Redmond of Florida, Dr. T. H. Hoskins of Vermont, Prof. D. P. Penhallow of Quebec, J. S. Harris of Minnesota, Prof. Geo. Husmann of California, and Chas. G. Boerner of Indiana.

On Irrigation.—Prof. E. W. Hilgard of California, J. M. Smith of Wisconsin, T. V. Munson of Texas, D. S. Grimes of Colorado, J. H. Hale of Connecticut, S. Barnard of Nebraska, and Rev. D. Peebles of Utah.

On Landscape Gardening.—Robert Manning of Mass., C. L. Allen of New York, R. H. Warder of Ohio, Chas. Gibb of Quebec, Prof. S. M. Tracy of Missouri, E. Y. Teas of Indiana, and W. G. Klee of California.

On Floriculture.—Frank Pentland of Ohio, M. A. Hunt of Illinois, Peter Henderson of New York, E. M. Fuller of Dakota, C. L. Allen of New York, J. J. Harrison of Ohio, and E. Y. Teas of Indiana.

On the Nursery.—Hon. C. L. Watrous of Iowa, N. H. Albaugh of Ohio, Franklin Davis of Maryland, S. D. Willard of New York, J. T. Lovett of New Jersey, John Rock of California, and W. F. Heikes of Alabama.

On Forestry.—Hon. N. J. Colman of District of Columbia, Hon. G. W. Minier of Illinois, Hon. R. W. Furnas of Nebraska, B. E. Fernow of District of Columbia, C. L. Watrous of Iowa, J. S. Hicks of New York, and R. H. Warder of Ohio.

On Vegetable Gardening.—Hon. J. M. Smith of Wisconsin, Sylvester Johnson of Indiana, H. L. Lyman of Virginia, J. S. Collins of New Jersey, S. C. Satterthwait of South Carolina, Rev. D. Peebles of Utah, and W. H. Cassell of Mississippi.

On Fruit and Vegetable Packages.—A. C. Kendel of Ohio, E. T. Hollister of Missouri, E. Williams of New Jersey, W. P. Mesler of Illinois, E. H. Williams of Indiana, F. Wellhouse of Kansas, and A. W. Wells of Michigan.

On Pomaceous Fruits.—Hon. P. Barry of New York, T. T. Lyon of Michigan, Robt. Manning of Massachusetts, Hon. Wm. Parry of New Jersey, Hon. H. E.

Van Deman of District of Columbia, G. B. Brackett of Iowa, and A. C. Hammond of Illinois.

On Stone Fruits.—Hon. P. J. Berckmans of Georgia, S. D. Willard of New York, J. C. Evans of Missouri, J. M. Howell of Texas, J. Van. Lindley of North Carolina, Henry Avery of Iowa, and Dr. John J. Black of New Jersey.

On Small Fruits.—Hon. J. M. Smith of Wisconsin, J. H. Hale of Connecticut, Matthew Crawford of Ohio, Dr. H. E. McKay of Mississippi, J. C. Evans of Missouri, Sylvester Johnson of Indiana, and G. F. B. Leighton of Virginia.

On Viticulture.—Geo. W. Campbell of Ohio, T. V. Munson of Texas, Isador Bush of Missouri, Prof. Geo. Husmann of California, T. S. Hubbard of New York, E. Williams of New Jersey, and E. M. Hudson of Alabama.

On Semi-tropic Fruits.—Edmund H. Hart of Florida, P. J. Berckmans of Georgia, Frank A. Kimball of California, J. T. Hardie of Louisiana, D. Redmond of Florida, E. M. Hudson of Alabama, and W. H. Cassell of Mississippi.

On Russian Fruits.—Chas. Gibb of Quebec, Prof. J. L. Budd of Iowa, A. G. Tuttle of Wisconsin, J. S. Harris of Minnesota, Geo. P. Peffer of Wisconsin, T. T. Lyon of Michigan, and S. D. Hillman of Minnesota.

On Nomenclature.—T. T. Lyon of Michigan, J. J. Thomas of New York, P. J. Berckmans of Georgia, H. E. Van Deman of District of Columbia, E. H. Hart of Florida, T. V. Munson of Texas, and G. B. Brackett of Iowa.

On Geology.—Prof. E. W. Hilgard of California, Dr. T. H, Hoskins of Vermont, W. C. Strong, of Massachusetts, Prof. W. J. Green of Ohio, Prof. W. C. Latta of Indiana, Wm. Roy, Esq., of Ontario, and J. H. Masters of Nebraska.

CORRESPONDENTS.

Allen, C. L., Garden City, New York.
Beadle, D. W., Sec'y Fruit Growers' Association, St. Catharines, Ontario.
Beal, Prof. W. J. (Agricultural College), Lansing, Michigan.
Burrill, Prof. T. J. (State University), Champaign, Illinois.
Berckmans, P. J., Pres. State Hort. Society, Augusta, Georgia.
Budd, Prof. J. L. (Agricultural College), Ames, Iowa.
Brackett, G. C., Sec'y State Hort. Society, Lawrence, Kansas.
Barnard, Samuel, Pres. State Hort. Society, Table Rock, Nebraska.
Brackett, Col. G. B., Denmark, Iowa.
Bush, Isador, St. Louis, Missouri.
Bryant, Arthur, Princeton, Illinois.
Beatty, J. S., Simpsonville, Kentucky.
Barry, Patrick, Pres. American Pom. Society, Rochester, New York.
Cassell, W. H., Canton, Mississippi.
Colman, Col. N. J., U. S. Commissioner of Agriculture, Washington, D. C.
Campbell, G. W., Sec'y State Hort. Society, Delaware, Ohio.
Cowing, Granville, Muncie, Indiana.

Doppelmair, Capt. G., Kiev, Russia.
Evans, J. C., Treas. American Hort. Society, Harlem, Missouri.
Furnas, Ex-Gov. R. W., Sec'y State Agri. Society, Brownville, Nebraska.
Forbes, Prof. S. A., State Entomologist, Champaign, Illinois.
Grimes, J. T., Treas. State Hort. Society, Minneapolis, Minnesota.
Grimes, D. S, Denver, Colorado.
Goodman, L. A., Sec'y State Hort. Society, Westport, Missouri.
Garfield, C. W., Sec'y American Pom. Society, Grand Rapids, Michigan.
Gibb, Charles, Abbotsford, Province of Quebec.
Galusha, O. B., Peoria, Illinois.
Green, Chas. A., Editor *Fruit-Grower*, Rochester, New York.
Hale, J. H., South Glastonbury, Connecticut.
Hape, Dr. Samuel, Atlanta, Georgia.
Hilgard, Prof. E. W., Pres. State Hort. Society, Berkeley, California.
Hudson, E. M., New Orleans, Louisiana.
Hollister, E. T., St. Louis, Missouri.
Hollister, Capt. E., Alton, Illinois.
Husmann, Prof. Geo., Napa, California.
Hatch, A. T., Pres. State Fruit Union, Suisun, California.
Hubbard, T. S., Fredonia, New York.
Hart, Edmund H., Federal Point, Florida.
Howell, J. M., Dallas, Texas.
Holsinger, F., Sec. Mo. Valley Hort. Society, Rosedale, Kansas.
Hammond, A. C., Sec'y State Hort. Society, Warsaw, Illinois.
Ingersoll, Prof. C. L., Pres. State Agricultural College, Fort Collins, Colorado.
Joly, Charles, 11 Rue Boissy d'Anglais, Paris, France.
Johnson, S., Pres. State Hort. Society, Irvington, Indiana.
Johnson, George Y., Pres. State Hort. Society, Lawrence, Kansas.
Lyon, T. T., Pres. State Hort. Society, South Haven, Michigan.
Lazenby, Prof. W. R., Columbus, Ohio.
Lovett, J. T., Little Silver, New Jersey.
Latta, Prof. W. C. (Purdue University), Lafayette, Indiana.
Merwin, C. M., Medina, Tennessee.
Manning, Robert, Sec'y State Hort. Society, Salem, Massachusetts.
Morton, Dr. J. W., Nashville, Tennessee.
Mohr, Dr. Charles, Mobile, Alabama.
McKay, Dr. H. E., Pres. State Hort. Society, Madison Station, Mississippi.
McWhorter, Tyler, Aledo, Illinois.
Munson, T. V., Vice-Pres. American Hort. Society, Denison, Texas.
Minier, George W., Pres. American Forestry Congress, Minier, Illinois.
Nowlin, S. H., Sec'y State Hort. Society, Little Rock, Arkansas.
Ohmer, N., Pres. State Hort. Society, Dayton, Ohio.
Plumb, J. C., Milton, Wisconsin.
Parry, William, Parry Postoffice, New Jersey.
Pierce, L. B., Talmadge, Ohio.
Rock, John, San Jose, California.
Rosaman, J. W., Gadsden, Tennessee.

Roy, William, Owen Sound, Ontario.
Riley, Prof. C. V., United States Entomologist, Washington, D. C.
Ragan, Z. S., Independence, Missouri.
Smith, J. M., Pres. State Hort. Society, Green Bay, Wisconsin.
Scott, D. Wilmot, Sec'y American Nurserymen's Association, Galena, Illinois.
Samuels, William M., Clinton, Kentucky.
Stayman, Dr. J., Leavenworth, Kansas.
Seymour, Prof. A. B. (Harvard College), Cambridge, Massachusetts.
Thomas, J. J., Author Fruit Culturist, Union Springs, New York.
Teas, E. Y., Dunreith, Indiana.
Tracy, Prof. S. M. (Agricultural College), Columbia, Missouri.
Vick, James, Rochester, New York.
Watrous, C. L., Pres. Amer. Association of Nurserymen, Des Moines, Iowa.
Webber, A. W., Nashville, Tennessee.
Weltz, Leo, Treas. American Forestry Congress, Wilmington, Ohio.
Webb, A. D., Bowling Green, Kentucky.
Williams, E., Sec'y State Hort. Society, Montclair, New Jersey.
Willard, A. D., Geneva, New York.

LIST OF MEMBERS

FOR 1886-7.

L. F. Adams, 32 and 34 South Delaware street, Indianapolis Indiana.
B. F. Adams, Madison ..... Wisconsin.
H. C. Adams, Madison ..... Wisconsin.
Agricultural College, Manhattan..... Kansas.
N. H. Albaugh, Tadmore..... Ohio.
Albertson & Hobbs, Bridgeport..... Indiana.
Silas L. Albertson, Roslyn ..... New York.
Dr. Joseph Albrecht, New Orleans..... Louisiana.
B. F. Aldrich, Hillsdale..... Michigan.
S. B. Alexander, Matthews..... North Carolina.
Abner Allen, Wabaunsee..... Kansas.
D. C. Allen, Greencastle..... Indiana.
E. W. Allen, 171 Front street, Portland..... Oregon.
Charles L. Allen, Garden City..... New York.
A. A. Arnold, Galesville..... Wisconsin.
George G. Atwood, Geneva..... New York.
P. M. Augur, Middlefield..... Connecticut.
Mrs. Helen V. Austin, Johnstown..... Pennsylvania.
Henry Avery, Burlington..... Iowa.
E. F. Babcock, Russell..... Arkansas.
Josh. G. Bailey, Columbia..... Tennessee.
David Baird, Manalapan..... New Jersey.
Theodore F. Baker, Bridgeton..... New Jersey.
J. D. Baldwin, Ann Arbor..... Michigan.
Samuel Barnard, Sec'y State Hort. Soc'y, Table Rock..... Nebraska.
W. H. S. Barquin, Henderson..... North Carolina.
Herbert H. Barney, Belleville..... New York.
Capt. C. L. Bartlett, Ravenna..... Ohio.
Joseph F. Barton, 220 East Randolph street, Chicago..... Illinois.
James A. Bayless, Lee's Summit..... Missouri.
J. S. Beatty, Simpsonville..... Kentucky
H. Y. Beebe, Pres. Hort. Soc'y, Ravenna..... Ohio.
W. H. Beebe, Ravenna..... Ohio.
Fielding Beeler, Indianapolis..... Indiana.
Simon Beiter, Zoar..... Ohio.
C. S. Bell, Jr., Lexington..... Kentucky.
C. W. Bell, Passadena..... California.
Prof. C. J. Bell, Kenton..... Tennessee.
F. M. Benham, Petosky..... Michigan.
P. J. Berckmans, Pres. State Hort. Soc'y, Augusta..... Georgia.
Dr. A. P. Berghoff, 376 Superior street, Cleveland..... Ohio.
T. Bermingham, 131 South Water street, Chicago..... Illinois.

W. F. Bird, Ann Arbor.....Michigan.
J. C. Blair, Kansas City.....Missouri.
Dr. John J. Black, Newcastle.....Delaware.
Samuel L. Boardman, Sec'y State Hort. Soc'y, Augusta.....Maine.
Charles G. Boerner, Vevay.....Indiana.
George E. Boggs, Waynesville.....North Carolina.
G. B. Brackett, Sec'y State Hort. Soc'y, Denmark.....Iowa.
G. C. Brackett, Sec'y State Hort. Soc'y, Lawrence.....Kansas.
D. W. Bridgeman, Lone Pine.....Wash'ton Ter.
Thomas Brigden, South Lowell.....Alabama.
John H. Britton, Painesville.....Ohio.
Brown Bros., Somerset.....Kentucky.
A. B. Brown, Villa Ridge.....Illinois.
D. & H. Brown, Brandt.....Ohio.
Mrs. O. W. Brownback, Pendleton.....Indiana.
Arthur Bryant, Princeton.....Illinois.
J. G. Buback, Princeton.....Illinois.
J. P. Buck, Appleton.....Wisconsin.
Frank H. Buck, Vacaville.....California.
Benjamin Buckman, Farmingdale.....Illinois.
Prof. J. L. Budd, Agricultural College, Ames.....Iowa.
Prof. T. J. Burrill, State University, Champaign.....Illinois.
Isador Bush, Bushberg.....Missouri.
William Byers, Kansas City.....Missouri.
E. F. Cadwallader, Louisburg.....Kansas.
R. H. Cadwallader, Louisburg.....Kansas.
E. H. Calkins, Burlington.....Iowa.
R. A. Cameron, Canon City.....Colorado.
I. V. Campbell, West Paris.....Missouri.
Geo. W. Campbell, Sec'y State Hort. Soc'y, Delaware.....Ohio.
J. E. Campbell, Humboldt.....Tennessee.
E. S. Carman, Editor *Rural New Yorker*, New York.....New York.
Charles Carpenter, Kelley's Island.....Ohio.
Prof. Jas. Cassidy, Agricultural College, Fort Collins.....Colorado.
W. H. Cassell, Canton.....Mississippi.
A. J. Caywood, Marlboro.....New York.
R. G. Chase, Geneva.....New York.
Thos. H. Child, 420 Library St., Philadelphia.....Pennsylvania.
J. L. Childs, Queens.....New York.
Dr. W. B. Clarke, Beebe.....Arkansas.
V. S. Clark, Gibson.....Michigan.
E. J. Claussen, Bismarck.....Dakota.
Clemons, Cloon & Co., Kansas City.....Missouri
Coe & Converse, Fort Atkinson.....Wisconsin.
Lawrence Cole, 24 Chartres St., New Orleans.....Louisiana.
John S. Collins, Moorestown.....New Jersey.
John W. Collins, Liberty.....Missouri.
Hon. N. J. Colman, Commissioner of Agri., Washington.....D. C.
Columbus Horticultural Society, Columbus.....Ohio.
Chas. G. Comstock, Albany.....Missouri.
B. F. Coon, Elk Grove.....California.
Ellwood Cooper, Pres. State Board of Hort., Santa Barbara...California.
A. F. Cook, Gibbsville.....Wisconsin.
Wm. N. Cook, Grand Rapids.....Michigan.
Wm. Cook, Pres. State Hort. Society, Bowling Green.....Kentucky.
Chas. C. Cornett, Madison.....Indiana.

W. P. Corsa, Pres. State Fruit Exchange, Milford ..... Delaware.
Matthew Crawford, Cuyahoga Falls ..... Ohio.
F. B. Crawford, North East ..... Pennsylvania.
M. Crumrine, Junction City ..... Kansas.
Judge J. K. Cravens, Kansas City ..... Missouri.
J. V. Cotta, Nursery ..... Illinois.
Granville Cowing, Muncie, ... Indiana.
Prof. H. Culbertson, Lincoln ..... Nebraska.
B. O. Curtis, Paris ..... Illinois.
E. H. Cushman, Euclid ..... Ohio.
Cowley County, Kansas, Horticultural Society, Winfield ..... Kansas.
Daniel Cox, Treas. State Hort. Soc'y, Cartersburg ..... Indiana.
F. L. Dancy, Orange Mills ..... Florida.
George Davies, 58 and 60 Prospect St., Cleveland ..... Ohio.
Mrs. Hannah Davies, 9 Grace St., W. S., Cleveland ..... Ohio.
Franklin Davis, Baltimore and Paca St., Baltimore ..... Maryland.
W. R. Dawson, Bainbridge ..... Indiana.
R. N. Day, Tekama ..... Nebraska.
John W. Day, Crystal Springs ..... Mississippi.
Geo. W. Dean, Kent ..... Ohio.
C. N. Dennis, Hamilton ..... Illinois.
Department of Agriculture, Div. of Pom., Washington ..... D. C.
D. M. Dewey, Rochester ..... New York.
E. P. Diehl, Olathe ..... Kansas.
H. L. Doan, Jacksonville ..... Illinois.
Capt. G. G. Doppelmair, Kiev ..... Russia.
Cyrus Douglas, Tecumseh ..... Nebraska.
Robt. Douglas, Waukegan ..... Illinois.
H. M. Dunlap, Savoy ..... Illinois.
John B. Durand, Prairie City ..... Missouri.
J. A. Durkes, Weston ..... Missouri.
Dwyer & Vhay, Detroit ..... Michigan.
Parker Earle, Pres. Am. Hort. Society, Cobden ..... Illinois.
Mrs. Melanie T. Earle, Cobden ..... Illinois.
Frank S. Earle, Cobden ..... Illinois.
Charles T. Earle, Cobden ..... Illinois.
Mary T. Earle, Cobden ..... Illinois.
James Edgerton, Barnesville ..... Ohio.
Samuel Edwards, Mendota ..... Illinois.
G. C. Eisenmayer, Mascoutah ..... Illinois.
Chas. N. Eley, Smith's Point ..... Texas.
Ellwanger & Barry, Rochester ..... New York.
G. W. Endicott, Villa Ridge ..... Illinois.
G. F. Espenlaub, Rosedale ..... Kansas.
R. A. Evans, 123 Haverhill St., Boston ..... Massachusetts.
J. C. Evans, Treas. Am. Hort. Society, Harlem ..... Missouri.
J. J. Fairbanks, Denison ..... Texas.
H. A. Fairbank, Sec'y State Fruit Union, San Francisco ..... California.
C. Falkner, Waco ..... Texas.
C. W. Faust, Canton ..... Ohio.
D. C. Feeley, Patchen ..... California.
B. E. Fernow, Sec'y Am. Forestry Congress, Washington ..... D. C.
H. C. Fisher, Memphis ..... Tennessee.
Henry Fissell, Nottingham ..... Ohio.
Washington Folck, Marshall ..... Missouri.
J. Fonta, New Orleans ..... Louisiana.

Prof. S. A. Forbes, State Entomologist, Champaign ..... Illinois.
C. M. Forbes, Judsonia ..... Arkansas.
Frank Ford & Son, Ravenna ..... Ohio.
W. G. Ford, Citra ..... Florida.
H. B. Francis, Mulberry ..... Missouri.
D. O. Frantz & Son, Springfield ..... Ohio.
E. M. Fuller, Bismarck ..... Dakota.
Gov. R. W. Furnas, Sec. State Board Agriculture, Brownville ..... Nebraska.
J. H. Gail, 153 Michigan street, Buffalo ..... New York.
A. I. Gale, Waukesha ..... Wisconsin.
Samuel Gainer, Pilot Point ..... Texas.
W. G. Gano, Parkville ..... Missouri.
Charles W. Garfield, Sec'y Amer. Pom. Soc'y, Grand Rapids ..... Michigan.
S. H. Garrett, Mansfield ..... Ohio.
Hon. Charles Gibb, Abbottsford ..... Quebec.
Joseph Gilbert, Terre Haute ..... Indiana.
A. H. Gilkeson, Warrensburg ..... Missouri.
Mrs. Mary J. Gilkeson, Warrensburg ..... Missouri.
J. Y. Gilmore, 6 Camp street, New Orleans ..... Louisiana.
L. A. Goodman, Sec'y State Hort. Soc'y, Westport ..... Missouri.
Dr. A. Goslin, Oregon ..... Missouri.
F. G. Gould, Excelsior ..... Minnesota.
George H. Graham, Austin ..... Illinois.
Miss Ida M. Graham, Austin ..... Illinois.
W. H. Gray, Brookville ..... Pennsylvania.
Charles A. Green, Editor *Green's Fruit Grower*, Rochester ..... New York.
Prof. W. J. Green, Experiment Station, Columbus ..... Ohio.
F. B. Green, Perry ..... Ohio.
W. Greene, Davenport ..... Iowa.
A. H. Griesa, Lawrence ..... Kansas.
Dr. C. H. Gregory, Van Buren ..... Arkansas.
Tuisco Greiner, Editor *Orchard and Garden*, Little Silver ..... New Jersey.
D. S. Grimes, Denver ..... Colorado.
J. T. Grimes, Treas. State Hort. Soc'y, Minneapolis ..... Minnesota.
Samuel Grondyke, Eugene ..... Indiana.
Judge Charles U. Grote, Mauston ..... Wisconsin.
Prof. F. A. Gulley (Agri. College), Agricultural College ..... Mississippi.
J. H. Hale, South Glastonbury ..... Connecticut.
A. C. Hammond, Sec'y State Hort. Soc'y, Warsaw ..... Illinois.
John T. Hardie, New Orleans ..... Louisiana.
T. C. Hardie, Crystal Springs ..... Mississippi.
Dr. Samuel Hape, Atlanta ..... Georgia.
L. Harms, Euclid ..... Ohio.
J. S. Harris, La Crescent ..... Minnesota.
J. L. Harris (Harris, Parker & Co.), New Orleans ..... Louisiana.
A. W. Harrison, Germantown ..... Pennsylvania.
J. J. Harrison, Painesville ..... Ohio.
Edmund H. Hart, Federal Point ..... Florida.
E. M. Harwood, Shelbyville ..... Illinois.
A. T. Hatch, Pres. State Fruit Union, Suisun ..... California.
D. C. Hawthorne, Leavenworth ..... Kansas.
William Hazen, Euclid ..... Ohio.
W. F. Heikes, Huntsville ..... Alabama.
Heikes Nurseries Company, Dayton ..... Ohio.
Peter Henderson, 35 Courtlandt street, New York ..... New York.
E. P. Henry, Butler ..... Missouri.

John S. Hicks, Roslyn ..... New York.
Amos Hiestand, Vincent ..... Pennsylvania.
J. G. Higginson, Hawkesbury ..... Ontario.
Prof. E. W. Hilgard, Pres. State Hort. Soc'y, Berkeley ..... California.
David Hill, Dundee ..... Illinois.
S. D. Hillman, Sec'y State Hort. Soc'y, Minneapolis ..... Minnesota.
C. M. Hobbs, Sec'y State Hort. Soc'y, Bridgeport ..... Indiana.
D. E. Hoffman, Winchester ..... Indiana.
H. M. Hoffman, Leavenworth ..... Kansas.
C. A. Hogan, Starkville ..... Mississippi.
Rev. F. R. Holland, Hope ..... Indiana.
E. T. Hollister, St. Louis ..... Missouri.
E. Hollister, Alton ..... Illinois.
F. Holsinger, Rosedale ..... Kansas.
H. E. Hooker, Rochester ..... New York.
C. L. Hopkins, Ass't Pomologist, Washington ..... D. C.
Wm. M. Hopkins, Kansas City ..... Missouri.
Dr. T. H. Hoskins, Newport ..... Vermont.
C. M. Hovey, 69 Tremont St., Boston ..... Massachusetts.
R. H. Howard, 792 Lafayette Ave., Brooklyn ..... New York.
J. M. Howell, Dallas ..... Texas.
Mrs. J. M. Howell, Dallas ..... Texas.
Earle Ragan Howell, Dallas ..... Texas.
A. B. Howell, Box 383, Chattanooga ..... Tennessee.
T. S. Hubbard, Fredonia ..... New York.
Wm. S. Hubbard, Indianapolis ..... Indiana.
Theophile Huber, Illinois City ..... Illinois.
E. M. Hudson, 20 Carondelet St., New Orleans ..... Louisiana.
Dr. Robt. Hughes, Okawville ..... Illinois.
Wellington Hughes, Hillsdale ..... Michigan.
F. A. Hull, Danbury ..... Connecticut.
R. A. Hunt, Euclid ..... Ohio.
Wm. Hunt, Ridott ..... Illinois.
M. A. Hunt, Treas. Soc'y American Florists, Wright's Grove ..... Illinois.
Mrs. David Huntley, Appleton ..... Wisconsin.
H. S. Hurd, Burlington ..... Ontario.
Prof. Geo. Husmann, Napa ..... California.
Indiana Horticultural Society, Indianapolis ..... Indiana.
Prof. C. L. Ingersoll, Pres. State Agri. College, Fort Collins ..... Colorado.
W. N. Irwin, South Salem ..... Ohio.
Joseph I. Irwin, Columbus ..... Indiana.
Mrs. H. C. Irwin, Columbus ..... Indiana.
Powell Jackson, Carthage ..... Missouri.
Wm. Jackson, Godfrey ..... Illinois.
Herman Jaeger, Neosho ..... Missouri.
Jasper County Hort. Society, Carthage ..... Missouri.
Jayne & Cole, Painesville ..... Ohio.
Z. K. Jewett, Sparta ..... Wisconsin.
H. A. Johns, Sioux City ..... Iowa.
Sylvester Johnson, Pres. State Hort. Society, Irvington ..... Indiana.
Geo. Y. Johnson, Pres. State Hort. Society, Lawrence ..... Kansas.
B. F. Johnson, Champaign ..... Illinois.
F. C. Johnson, Kishwaukee ..... Illinois.
Prof. J. W. Johnson, Leavenworth ..... Kansas.
James T. Johnson, Warsaw ..... Illinois.

P. W. Johnson, Wake Forest.....N. Carolina.
Mrs. J. R. Johnson, Sec'y State Hort. Society, Dallas.....Texas.
Charles Joly, Vice Pres. Royal Hort. Society, 11 Rue Boissy d'Anglas, Paris.....France.
George S. Josselyn, Fredonia.....New York.
John Kaufman, Kansas City.....Missouri.
Geo. J. Kellogg, Janesville.....Wisconsin.
C. C. Kelsey, Humboldt.....Kansas.
A. C. Kendel, Cleveland.....Ohio.
Mrs. A. C. Kendel, Cleveland.....Ohio.
J. S. Kerr, Sherman.....Texas.
A. W. Kerr, Sherman.....Texas.
Frank A. Kimball, National City.....California.
Warren C. Kimball, National City.....California.
William King, Newton Falls.....Ohio.
E. W. Kirkpatrick, McKinney.....Texas.
T. W. Kizer, Winchester.....Indiana.
W. G. Klee, Inspector of Fruit Pests, San Francisco.....California.
O. P. Laird, Mesopotamia.....Ohio.
D. S. Lake, Shenandoah.....Iowa.
D. W. Langdon, Mobile.....Alabama.
W. H. Larrabee, Box 1532, Plainfield.....New Jersey.
Prof. W. C. Latta, Purdue University, Lafayette.....Indiana.
Prof. W. R. Lazenby, Experiment Station, Columbus.....Ohio.
Frank H. Leavenworth, Detroit.....Michigan.
Gen. S. D. Lee, Pres. Agri. College, Agricultural College.....Mississippi.
G. F. B. Leighton, Norfolk.....Virginia.
Prof. J. G. Lemmon, Botanist, Oakland.....California.
J. P. Lesley, Winchester.....Indiana.
Ross Lewers, Franktown.....Nevada.
J. Van. Lindley, Pres. State Hort. Soc'y, Pomona.....North Carolina.
J. A. Lineback, Salem.....North Carolina.
James Lippincott, Jr., Mount Holly.....New Jersey.
Victor Litory, Wartburg.....Tennessee.
S. W. Little, Los Angeles.....California.
Horatio P. Livermore, Oakland.....California.
Ralph Lodge, Cuyahoga Falls.....Ohio.
T. Loomis, Crete.....Nebraska.
F. W. Loudon, Janesville.....Wisconsin.
John T. Lovett, Little Silver.....New Jersey.
George Luster, Collamer.....Ohio.
Henry L. Lyman, Charlottsville.....Virginia.
T. T. Lyon, Pres. State Hort. Soc'y, South Haven.....Michigan.
William Lyons, Box 685, Minneapolis.....Minnesota.
D. Magone, Custom House, New York.....New York.
R. Maitre, 7 Camp street, New Orleans.....Louisiana.
William Nelson Mann, Riverside.....California.
Robert Manning, Sec'y State Hort Soc'y, Salem.....Massachusetts.
J. F. Martin, Pres. County Hort. Soc'y, Winfield.....Kansas.
T. E. B. Mason, Shenandoah.....Iowa.
Massachusetts Agricultural College Library, Amherst.....Massachusetts.
J. H. Masters, Nebraska City.....Nebraska.
D. W. Matthews, Salem.....Oregon.
J. B. Matthews, Marissa.....Illinois.
Monroe Mattison, Englewood.....New Jersey.
J. W. Maxwell, Euclid.....Ohio.

J. J. Measer, Hutchinson.....Kansas.
Col. J. B. Mead, Randolph.....Vermont.
W. Meixell, Parsons.....Kansas.
E. G. Mendenhall, Kinmundy.....Illinois.
R. J. Mendenhall, 1 Ave. S and 18th street, Minneapolis.....Minnesota.
John Mentch & Son, Winfield.....Kansas.
C. M. Merwin, Medina.....Tennessee.
W. P. Mesler, Cobden.....Illinois.
Mrs. W. P. Mesler, Cobden.....Illinois.
G. N. Milco, Stockton.....California.
B. S. Miles, Gray's Summit.....Missouri.
F. C. Miller, New Philadelphia.....Ohio.
Curtis J. Miller, Canal Fulton.....Ohio.
J. C. Miller, Rome.....Georgia.
G. W. Minier, Pres. American Forestry Congress, Minier.....Illinois.
Judge H. C. Minter, Keytsville.....Missouri.
J. H. Monsees, Beaman.....Missouri.
Elisha Moody, Lockport.....New York.
Mrs. Hattie R. Moore, Greencastle.....Indiana.
David M. Moore, Ogden.....Utah.
Hon. J. Sterling Morton, Nebraska City.....Nebraska.
W. H. Morrison, Madison.....Wisconsin.
J. T. Moss & Sons, Ashboro.....Indiana.
T. V. Munson, Pres. State Hort Soc'y, Denison.....Texas.
Mrs. Maria Munson, Denison.....Texas.
J. T. Munson, Denison.....Texas.
M. B. Munson, Denison.....Texas.
Dr. R. D. Murry, Biloxi.....Mississippi.
John McCaffery, Cobden.....Illinois.
M. L. McClave, Benton Harbor.....Michigan.
A. L. McClay, 85 South Water street, Chicago.....Illinois.
Dr. H. E. McKay, Pres. State Hort. Soc'y, Madison Station.....Mississippi.
Dr. J. H. McKay, Madison Station.....Mississippi.
Prof. A. B. McKay, Agri. College, Agricultural College.....Mississippi.
W. R. McKeen, Terre Haute.....Indiana.
H. G. McPike, Alton.....Illinois.
Tyler McWhorter, Aledo.....Illinois.
F. Neibauer, Dongola.....Illinois.
E. F. Nelson, New Orleans.....Louisiana.
A. F. Newell, Warren.....Ohio.
J. S. Newmyer, Love Lake.....Missouri.
Niagara White Grape Co., Lockport.....New York.
James Nimon, Denison.....Texas.
J. H. Norwood, Box 68, Montgomery.....Alabama.
S. H. Nowlin, Sec'y State Hort. Society, Little Rock.....Arkansas.
N. Ohmer, Pres. State Hort. Society, Dayton.....Ohio.
Gilbert Onderdonk, Nursery.....Texas.
George Ort, Charleston.....West Virginia.
Rev. E. H. Otting, Wadsworth.....Ohio.
E. S. Paddock, Forestville.....California.
S. C. Palmer, Kansas City.....Missouri.
William Parry, Parry P. O.....New Jersey.
John R. Parry, Parry P. O.....New Jersey.
M. I. Parker, Carthage.....Missouri.
C. G. Patten, Pres. State Hort. Society, Charles City.....Iowa.
Charles Patterson, Kirksville.....Missouri.
Charles H. Payson, Belmont.....N. Hampshire.

Miss H E. Peake, Fairmount Ave., Jersey City.....New Jersey.
M. Pearce, Minneapolis.....Minnesota.
Rev. David Peebles, Bountiful.....Utah.
Geo. P. Peffer, Pewaukee.....Wisconsin.
Theodore A. Peffer, South Bend.....Indiana.
W. P. Peirce, Hoopeston.....Illinois.
Prof. D. P. Penhallow, McGill College, Montreal.....Quebec.
Edward Perry, Denison.....Texas.
F. K. Phoenix, Delavan.....Wisconsin.
S. T. Phoenix, Charleston.....Missouri.
L. B. Pierce, Talmadge.....Ohio.
Chas. F. Pierce, 205 La Salle St., Chicago.....Illinois.
J. E. Pleasants, Santa Anna.....California.
J. C. Plumb, Milton.....Wisconsin.
W. S. Plummer. Leavenworth.....Kansas.
G. Poindexter, Blue Lick.....Indiana.
Amos Poole, Cobden.....Illinois.
Prof. E. A. Popenoe, Agri. College, Manhattan.....Kansas.
W. P. Popenoe, Topeka.....Kansas.
O. F. Powers, Euclid.....Ohio.
Pratt Bros., Rochester.....New York.
Mark E. Price, Newark.....Ohio.
J. H. Priest, Greencastle.....Indiana.
E. F. Purington, West Farmington.....Maine.
Walter J. Quick, Columbus.....Indiana.
Wm. Radam, Austin.....Texas.
Z. S. Ragan, Independence.....Missouri.
W. H. Ragan, Greencastle.....Indiana.
R. M. Ragan, Fillmore.....Indiana.
J. W. Ragan, Fillmore.....Indiana.
J. S. Ragan, Hartland.....Kansas.
H. H. Ragan, Salem.....Oregon.
Miss Belle Ragan, Greencastle.....Indiana.
Horace Rainey, Columbia.....Tennessee.
T. D. Randall & Co., 219 S. Water St., Chicago.....Illinois.
L. K. Ranney, Hudson.....Ohio.
J. C. Ratliff, Richmond.....Indiana.
D. Redmond, Jacksonville.....Florida.
Arthur E. Rendle, 92 Broadway, New York.....New York.
P. C. Reynolds, Editor *Rural Home*, Rochester.....New York.
J. C. Ridpath, LL. D., Greencastle.....Indiana.
E. A. Riehl, Pres. State Hort. Society, Alton.....Illinois.
Chas. V Riley, U. S. Entomologist, Washington.....D. C.
J. W. Robinson, Towanda.....Kansas.
John Rock, San Jose.....California.
J. B. Rogers, Milburn.....New Jersey.
Rommel & Sobbe, Morrison.....Missouri.
O. P. Rooks, Fruitland.....Florida.
J. W. Rosaman, Gadsden.....Tennessee.
Lucius Rose, Akron.....Ohio.
Rose Manufacturing Co., New York.....New York.
W. E. Rosebro, Crawfordsville.....Indiana.
Wm. Roy, (Royston Park) Owen Sound.....Ontario.
Geo. E. Ryckman, Brockton.....New York.
Wm. M. Samuels & Co., Clinton.....Kentucky.
John M. Samuels, Malesus.....Tennessee.

James Sanders, Westfield.....Indiana.
Prof. Jas. Satterlee, Lansing.....Michigan.
S. C. Satterthwait, Aiken.....South Carolina.
Prof. Wm. Saunders, Entomologist, London.....Ontario.
Wm. Saunders, Experiment Gardens, Washington.....D. C.
Dr. A. Schaffranck, Botanist, Palatka.....Florida.
J. G. Schaible, Elyria.....Ohio.
Dr. H. Schroeder, Bloomington.....Illinois.
L. K. Schofield, Fort Scott.....Kansas.
Robert Schuetz, Clay Center.....Kansas.
D. Wilmot Scott, Sec'y Am. Ass'n Nurserymen, Galena.....Illinois.
E. H. Scott, Ann Arbor.....Michigan.
W. H. Sebring, Bronson.....Florida.
Secretary Horticultural Society, Leavenworth.....Kansas.
F. L. Seeley, Box 536, Geneva.....Ohio.
Prof. A. B. Seymour, Harvard College, Cambridge.....Massachusetts.
Dr. Alexander Shaw, Denver.....Colorado.
C. M. Sheffer, South Haven.....Michigan.
George L. Shoup, Salmon City.....Idaho.
Dr. J. F. Simonds, Wed ngton.....Arkansas.
Simpson & Hogue, Vincennes.....Indiana.
J. H. Simpson, Manatee.....Florida.
J. Lee Simpson, Tonganoxie.....Kansas
F. R. Skinner, Eau Claire.....Wisconsin.
J. M. Smith, Pres State Hort. Soc'y, Green Bay.....Wisconsin.
Rufus W. Smith, Elmer.....New Jersey.
E. Ashley Smith, Lockport.....New York.
E. H. Smith, Sec'y Hort. Soc'y, Dubuque.....Iowa.
J. S. Smith, Carrolton.....Illinois.
W. & T. Smith, Geneva.....New York.
Dr. A. L. Small, Kankakee.....Illinois.
J. I. Southwick, Bennett.....Nebraska.
Henry Speer, Butler.....Missouri.
John Spence, Santa Barbara.....California.
W. P. Stark, Louisiana.....Missouri.
C. R. H. Starr, Sec'y Fruit Growers' Assoc'n, Port Williams...Nova Scotia.
Dr. J. Stayman, Leavenworth.....Kansas.
E. F. Stephens, Crete.....Nebraska.
S. T. Sterling, Camden.....Indiana.
J. C. Stevens, Centreville.....Indiana.
Nat. Stevens, Forney.....Texas.
J. S. Stickney, Wauwatosa.....Wisconsin.
Mrs. M. L. Still, Fremont.....Ohio.
C. B. Stone, M. D., Himrods.....New York.
I. N. Stone, Sioux City.....Iowa.
A. Stone, Winchester.....Indiana.
G. W. Stoner, Jewella.....Louisiana.
W. J. Storrs, Painesville.....Ohio.
W. C. Strong, Brighton.....Massachusetts.
F. W. Strachan, Keysville.....Florida.
George J. Streetor, Garrettsville.....Ohio.
Alphonse Stude, Houston.....Texas.
Henry Sverup & Son, 22 and 24 S. Delaware st., Indianapolis..Indiana.
Kizo Tamari, Japanese Consulate, New York.....New York.
Franklin Taylor, Indianapolis.....Indiana.
B. W. Taylor (John Henry & Co.), New Orleans.....Louisiana.

E. Y. Teas, Dunreith.....Indiana.
J. C. Teas, Carthage.....Missouri.
William Ten Brook, Rockville.....Indiana.
John J. Thomas, Union Springs.....New York.
F. A. Thomas, 104 South Water street, Chicago.....Illinois.
W. H. Thomas, LaGrange.....Missouri.
A. Thomas, Box 901, New Orleans.....Louisiana.
W. W. Thompson, Smithville.....Georgia.
T. W. Thompson, Makanda..... Illinois.
Dr. W. Thompson, Effingham.....Illinois.
W. K. Tipton, Sec'y State Hort. Soc'y, Little Rock.....Arkansas.
L. Traber, 531 Main street, Kansas City.....Missouri.
Prof. S. M. Tracy, Agricultural College, Columbia.....Missouri.
Prof. James Troop, Purdue University, Lafayette..... Indiana.
George A. Tryon, Galesburg.....Illinois.
H. G. Tryon, Willoughby.....Ohio.
J. H. Tryon, Willoughby.....Ohio.
W. H. Turner, Waco.....Texas.
C. B. Turrill, S. P. R. R., San Francisco.....California.
A. G. Tuttle, Baraboo.....Wisconsin.
A. Clark Tuttle, Baraboo.....Wisconsin.
Sidney Tuttle & Co., Bloomington.....Illinois.
Geo. E. Tyler, Collamer.....Ohio.
L. E. Tyler, 115 Canal St., New Orleans.....Louisiana.
E. B. Underhill, Poughkeepsie.....New York.
Underwood & Emery, Lake City.....Minnesota.
W. G. Upchurch, Raleigh.....North Carolina.
Prof. H. E. Van Deman, U. S. Pomologist, Washington.....D. C.
John W. Van Deman, Benzonia.....Michigan.
C. L. Van Dusen, Nursery Co., Geneva.....New York.
D. H. Vangelder, Catskill.....New York.
J. C. Vaughan, 42 La Salle St., Chicago.....Illinois.
J. C. Vickery, Fort Scott.....Kansas.
J. R. Vidmer, Alexandria.....Alabama.
Garrett Voorhees, Nottingham.....Ohio.
W. G. Voorhies, South Frankfort.....Michigan.
Voorhees & Co., Detroit.....Michigan.
H. G. Vorce, Euclid.....Ohio.
C. M. Vorce, Cleveland.....Ohio.
Dr. J. R. Walker, Bay St. Louis.....Mississippi.
Maj. E. G. Wall, Jackson.....Mississippi.
J. M. Ward, Naples.....Illinois.
Prof. R. B. Warder, Purdue University, Lafayette.....Indiana.
R. H. Warder, North Bend.....Ohio.
B. C. Warfield, Sandoval.....Illinois.
C. L. Watrous, Pres. A. A. of Nurserymen, Des Moines.....Iowa.
Chas. H. Weaver & Co., 129 S. Water St., Chicago.....Illinois.
A. D. Webb, Bowling Green.....Kentucky.
A. W. Webber, Nashville.....Tennessee.
Prof. F. M. Webster, Purdue University, Lafayette.....Indiana.
Jabez Webster, Centralia.....Illinois.
Mrs. Hannah E. Weinberger, St. Helena.....California.
D. B. Weir, Lacon.....Illinois.
F. Wellhouse, Treas. State Hort. Society, Fairmount.....Kansas
A. W. Wells & Co., St. Joseph.....Michigan.
Leo Weltz, Treas. Amer. Forestry Congress, Wilmington....Ohio.

Emile Westermann, Malvern.....Arkansas.
W. A. Wheeler, Perry .....Ohio.
Jas. L. Whippo, Anderson.....Indiana.
A. R. Whitney, Treas. A. A. of Nurserymen, Franklin Grove..Illinois.
Anthony Wiegand, Indianapolis.....Indiana.
S. M. Wiggins, 36 Tchoupitoulas St., New Orleans.....Louisiana.
I. A. Wilcox, Santa Clara.....California.
S. D. Willard, Geneva.....New York.
*Hon. Marshall P. Wilder, Pres. Am. Pom. Society, Boston...Massachusetts.
E. Williams, Sec'y State Hort. Society, Montclair.....New Jersey.
H. S. Williams, Rockledge.....Florida.
E. H. Williams, 23 S. Delaware St., Indianapolis.....Indiana.
Garrett Williams, Whitner.....Arkansas.
A. B. Williams, Fayetteville.....North Carolina.
L. A. Williams, Glenwood.....Iowa.
Dr. R. J. Williams, Gadsden.....Tennessee.
J. K. Williamson, Edwardsville.....Kansas.
Silas Wilson, Atlantic.....Iowa.
Rev. Andrew Wilson, Ravenna.....Ohio.
Prof. H. H. Wing, Lincoln.....Nebraska.
Henry Winters, Glenville.....Ohio.
Theodore Winters, Franktown.....Nevada.
F. G. Withoft, Dayton.....Ohio.
C. N. Wixon, Starkey.....New York.
Mrs. Nevie Woods, Pecksburg.....Indiana.
S. Worden, Minnetto.....New York.
D. H. Wright, Minneapolis.....Minnesota.
Geo. H. Wright, Sioux City.....Iowa.
T. N. Wylie, Pilot Point.....Texas.
Daniel Wysse, New Philadelphia.....Ohio.
J. B. Yellowly, Madison.....Mississippi.
J. H. York, Fort Scott.....Kansas.
A. M. York, Denton.....Texas.

---

*Deceased.

PROCEEDINGS

OF THE

SEVENTH ANNUAL MEETING

OF THE

AMERICAN HORTICULTURAL SOCIETY.

(Formerly the Mississippi Valley Horticultural Society.)

As per programme, the American Horticultural Society convened in the hall of the Board of Trade in the city of Cleveland, Ohio, for its seventh annual meeting, on Tuesday, at 2 o'clock P. M., September 7, 1886, Hon. Parker Earle, President, presiding.

A very creditable delegation, consisting of leading horticulturists and press representatives from a large number of the States, was present at the opening session. Among the press representatives were the following:

C. A. Green, *Green's Fruit Grower* and *New York Tribune*, Rochester, N. Y.; L. B. Pierce, *Country Gentleman*, Talmadge, Ohio; Ella Grant Campbell, *American Garden and Florist*, Cleveland, Ohio; John T. Bourke, *Leader* and *Herald*, Cleveland, Ohio; Wm. Perkins, *Plaindealer*, Cleveland, Ohio; Samuel Heughs, *The Press*, Cleveland, Ohio; Tuisco Greiner, *Orchard and Garden*, Little Silver, N. J.; Howard Hendricks, *New York Tribune* (daily), Kingston, N. Y.; Prof. A. B. McKay, *Live Stock Journal*, Agricultural College, Mississippi; Frank H. Leavenworth, *American*

Horticulturist, Detroit, Mich.; P. C. Reynolds, *American Rural Home*, Rochester, N. Y.; M. E. Williams, *Ohio Farmer*, Cleveland, Ohio; Prof. Jas. Troop, *Indiana Farmer*, Lafayette, Ind.; Herbert Myrick, *New England Homestead*, Springfield, Mass.; George E. Boggs, *Country Homes*, Waynesville, N. C.; W. Z. Hutchison, *Country Gentleman* and *Farmers' Review*, Rogersville, Mich.

President Earle, in calling the meeting to order, said:

I wish to allude to the rather unfortunate time of holding this meeting—a fact which did not present itself so forcibly until recently, when so many of our prominent members have expressed regrets at not being able to attend, on account of the very busy season of the year for almost all classes of horticulturists; on account of numerous fairs and exhibitions of local importance; on account of the opening of the colleges and universities throughout the country, in which our people, as a rule, are so directly and indirectly interested; and, finally (though the season of the year is in no manner responsible), because of the failure of the railroads to grant us any special rates in attending the meeting. I, however, considering the great number of disadvantages surrounding us, am pleased to see present so many old and familiar faces, with others that are new and strange, yet with which we hope soon to be well acquainted. Our most successful meetings (at Kansas City and New Orleans) have been held in the winter, when we are not only brighter and think more clearly, but also when we, as a class, have more leisure. It may be wise to consider these things in arranging for our next meeting.

In this connection, and as indicating the general interest in the labors of our society, the following interesting letters from absent friends we will here present to the society:

LETTERS OF INTEREST FROM ABSENT FRIENDS.

[A few of these letters were read, but, owing to the lack of time, the greater number were referred for publication without reading. Many of these letters embody valuable suggestions, while each indicates a friendly feeling and general interest in the affairs of the Society and in the promotion of American Horticulture.

The wide geographical distribution of the writers, together with their known reputation in connection with horticultural affairs, will indicate the far-reaching influence of the Society. One letter especially, that of the lamented Wilder, who has so recently been called hence, though written at the ripe age of four-score and eight years,

well indicates the zeal and enthusiasm which has so well characterized the writer throughout a long and useful life. While commenting on his lamented death, and knowing the high esteem in which he was held by all who are in any wise interested in American Horticulture, the Secretary can not refrain from here publishing the following beautiful eulogy (though not written for the public eye), from the pen of our own Munson. SECRETARY.]

Well, we mourn again. *The father of American Pomology*—THE GREAT WILDER, more worthy of a nation's sorrow than any President the United States ever had—*is dead.* No, he only *rests,* while his works and words rekindle into greater warmth and life than ever. For years he and his friends have anxiously watched his declining steps, each of which sunk deeper than the last into the pages of immortal history, and each of which we feared might be his last, and now we recognize that in his death he has set the seal upon one of the purest and grandest lives ever lived. *That* sealing was long deferred, till the fullness of years rounded out the most perfect model of man. It would be selfish to longer desire that he should bear the infirmities of flesh, and deny himself the perfect rest he now enjoys, though so anxiously did we all hope he would survive till the Boston meeting of the American Pomological Society, in September next, that we all might look upon the grand old man in his own home, still pouring wisdom out with a lavish hand to his children in pomology. T. V. MUNSON.

BOSTON, MASS., July 24, 1886.

MY DEAR SIR: Most cordially would I respond to your request, but really I am so overwhelmed with official duties, not to speak of private cares and correspondence, that I can not promise you a paper for your forthcoming American Horticultural meeting at Cleveland; and besides, I have to prepare two addresses, only just begun. I wish I could help you, and *if I were three-score years younger,* I would strain a point to do so.

MR. RAGAN, ESQ. MARSHALL P. WILDER.

HARLEM, MO., September 7, 1886.

W. H. RAGAN—Dear Sir: I was called away last week and got home on Sunday morning, expecting to leave for Cleveland on Monday, but found matters in a shape that prevents my going, which I very much regret, as I had in anticipation a great deal of pleasure in meeting so many old acquaintances and familiar faces, and enjoying with them that best and most pleasant part of all our good work, the social. Trusting that the meeting will be harmonious, pleasant and profitable,

I am fraternally, J. C. EVANS.

DENISON, TEXAS, August 25, 1886.

FRIEND RAGAN: As with the boy who could not go with the fishing party, you make me cry again, in your sincere appeals for me to go, and I know there will be lots of fish and heaps of fun; but my duties here, under our unfortunate depressions, say sternly, "No, you must not go this time." Still, I shall be with you there in mind. It satisfies my selfishness that at least I have friends there who will miss me, and it also satisfies my good wishes for the success of A. H. S. to feel certain that it will hold a great and good meeting on that occasion, and that its full success will demonstrate that, though an old and constant attendant may drop out, still the good work goes booming on. A. H. S., *in hoc signo!*

With best regards, T. V. MUNSON.

NEWTON HIGHLANDS, MASS., August 29, 1886.

W. H. RAGAN, ESQ.—My Dear Sir: I have extra work on my hands this fall, and shall not be able to be at your meeting at Cleveland. But you will have a good meeting, and with twenty-seven topics to be discussed by such able contributors, there will be no lack of food for thought.

Wishing you abundant success, I am

Yours truly, WM. C. STRONG.

GENEVA, N. Y., September 1, 1886.

W. H. RAGAN, SEC'Y, GREENCASTLE, IND.—Dear Sir: In reply to your late communication urging me to attend the meeting at Cleveland, next week, you may be sure that if it were in my power to do so, I should not fail to be on hand, and would lend all my aid to adding interest to the occasion; but as it is in the midst of our fruit season, which works me day and night, it is utterly impossible to be away from home for a single hour. You can not understand how deeply I regret that this is so, as enjoyment derived from a gathering of this sort is beyond my ability to describe. Under the circumstances, please make my kindest regrets to all of our mutual friends, and believe me Yours truly, S. D. WILLARD.

BUSHBERG, JEFFERSON CO., MO., September 4, 1886.

W. H. RAGAN, ESQ., SEC'Y AM. HORT'L SOC.—Dear Sir: Enclosed please find my annual membership fee. To my sincere regret, I am prevented from attending the meeting of your Society, the more so, as it convenes in the beautiful city of Cleveland, which is dear to me above any other place besides my home. I have visited it annually for the last eighteen years, was there in July this year, and would not the least object to go there again now, if I could, and invite you to visit the Jewish Orphan Asylum. You would find it more interesting than you may imagine. The illiberality of

the railroads will, I fear, prevent a large attendance. The severe rot in grapes here makes it impossible for my firm to send you some for exhibition. I can only send my warm friendly greetings to your President and the esteemed members of our Society, who may kindly remember me, and to whom I beg to be remembered by you.

With high regards to yourself, respectfully,

ISIDOR BUSH.

AUGUSTA, GA., July 20, 1886.

MR. W. H. RAGAN, GREENCASTLE, IND.—Dear Sir: I had hoped for a long rest this summer, but this seems not to be, as I was appointed, against my protest, early in May to an important trust relating to our county matters and had to serve continuously since. I am going away next week for a month's change, during which our State Horticultural and State Agricultural Societies hold their sessions at ten days difference, and where I am obliged to be present. After that I will go to the mountains for some weeks and cut loose from all work for awhile. I could not spare the time to do any acceptable work outside of what I am now compelled to go through with, and hope this will be my apology for my inability to accept your request. Yours truly, P. J. BERCKMANS.

SOUTH HAVEN, MICH., August 24, 1886.

FRIEND RAGAN: Your kind favor of 23d inst. is just at hand. I very much regret that the necessity of being prepared for our annual State Fair, which occurs the Monday following the meeting at Cleveland, will so employ my time that there seems no probability that I shall be able to meet you at Cleveland. I doubt not the occasion will be an interesting one, as the papers to be supplied seem very surely to indicate, and I am pretty sure to be with you in spirit at least. Very truly yours, T. T. LYON.

WARSAW, ILL., September 4, 1886.

HON. W. H. RAGAN—My Dear Sir: I have been quite sick for some days, and greatly fear that I shall not be able to meet with you next week, and therefore mail you my paper. This will be a sad disappointment, indeed, but is one of those things that we can not control. Hoping that you may have an interesting meeting,

I remain very truly yours, A. C. HAMMOND.

NATIONAL CITY, CAL., September 3, 1886.

MR. W. H. RAGAN, GREENCASTLE, IND.—My Dear Sir: By this morning's mail I enclose you my paper on "Olive Culture in California." I have already written President Earle, sending my regrets at being com-

pelled to forego the pleasures and profits of the meeting. I had set my heart on going, and had made every preparation, only to find, three days ago, that I must stay here. The disappointment to me, at not being able to attend the meeting, is great, aside from the fact that I wished to be present to urge the claims of this great State for the next meeting of the Society within its borders. Hoping not to enjoy such disappointment again,

I am very truly, FRANK A. KIMBALL.

TALCO VINEYARDS, NAPA, CAL., August 26, 1886.

W. H. RAGAN, ESQ.—Dear Sir: Inclosed please find my paper on "Past, Present and Future of Grape Growing in California." Grape growing here in its magnitude must be seen to be appreciated. Your Society should hold one of its meetings here, in the home of horticulture, and I am sure that I could promise you a royal welcome from its warm-hearted pomologists. What do you think of the idea? Please mention it to Mr. Earle, with my best regards and wishes for your future usefulness.

Yours fraternally, GEO. HUSMANN.

BERKELEY, CAL., July 31, 1886.

W. H. RAGAN, ESQ., SEC. AM. HORT. SOC., GREENCASTLE, IND.—My Dear Sir: Nothing would give me greater pleasure than to be able to attend the Cleveland meeting of the Society and deliver in person whatever I might have to say, if that were possible; but my vacation this year is purely nominal, and I can not leave the State and do justice to the work that is on my hands. I trust that the meeting will be abundantly successful, and will, among other things, try to exert some pressure in the direction of having the United States Department of Agriculture give horticulture its due share of attention in the future. Sincerely yours, E. W. HILGARD.

UNIVERSITY OF CALIFORNIA, BERKELEY, September 2, 1886.

PARKER EARLE, ESQ., PRES'T AM. HORT. SOC., CLEVELAND, O.—My Dear Sir: A letter just received from Prof. Husmann informs me that the possibility of the next meeting of the A. H. S. being held in California is being considered by some members. I fear it may be too late for this letter to reach you in time for the meeting, at which I am afraid not many California delegates will be present, as this is the busy season for us all. While I unfortunately can not send you a formal invitation from the State Horticultural Society, at whose last meeting I was not present, I am sure that I but echo what would be a universal sentiment of great satisfaction, in assuring you of a most cordial welcome to the delegates of the National Society, not only on the part of the State Society, but on that of the body of horticulturists of California, should they conclude to appoint San Francisco, or some other

point in the State, as the next place of meeting. As the pre-eminently horticultural State of the Union, California might fitly claim this honor among the first; but, in addition, we fondly believe that there is no other point where so great a variety of interesting facts would naturally come before the Society, both for inspection and discussion. We think that it would be especially useful at this period in the development of the fruit traffic, that the horticulturists of the Atlantic and the Pacific slopes should confer together as to what each may and may not undertake to do with the best prospects of success, instead of leaving all to the often somewhat severe lessons taught by competition. But from whatever standpoint the meeting be regarded, we sincerely hope that you will come to us next season, and assure you that no pains will be spared to make the occasion both a successful and pleasant one to our guests.

Very truly yours, E. W. HILGARD,
Pres't Cal. State Hort. Society.

OFFICE OF CANADIAN HORTICULTURIST,
ST. CATHARINES, ONT., July 24, 1886.

DEAR SIR: My engagements are such that it will not be possible for me to attend the meeting at Cleveland, though it would give me great pleasure, nor shall I have time to write a paper to send to you, I fear.

Your obedient servant, D. W. BEADLE, *Editor.*

LONDON, ENG., August, 24, 1886.

W. H. RAGAN, SEC'Y A. H. S., CLEVELAND, O.—Dear Sir: I can not be at Cleveland, as you see by my address. Have been at North Cape and among the Laplanders, in "land of the midnight sun." Have been at play, not at work. Yet I did take a glance into fruits of Sweden, and when so near could not resist the temptation of going to see Regel at St. Petersburg, and Shroeder at Moscow, and at Orel met Tvetjakoff, and have made out part and perhaps all of the lost list. At St. Petersburg saw young Regel, who has been nine years in Turkistan. There are fruits grown by the Chinese in Soongaria which we should have. Yours, etc. CHARLES GIBB.

ST. PETERSBURG, RUSSIA, March 17, 1886.

MR. W. H. RAGAN, SEC'Y A. H. S., GREENCASTLE, IND.—Dear Sir: Your amiable letter, with the Transactions of the American Horticultural Society and the Indiana Horticultural Society, have been forwarded to me, to this place, where I reside at the present time. Please accept my best thanks for your kind proceedings and the interesting papers that I read with such pleasure and delight. Your kind invitation to attend, in September, your meeting in Cleveland, to my great regret I can not realize. It must rest a pleasant dream for the future to have the pleasure and honor to meet with

you and the members of such a distinguished association as the American Horticultural Society. Please accept my warmest thanks to have thought of me on this occasion, to give me an opportunity to take part at your annual gathering, that would be of such interest and profit to me. With this letter I mail you the promised paper about tree planting in Russia to protect railroad tracks from snow-drifts. I am sorry that I have not had the ability to write my paper in your language. I have had to employ your permission to write in German, knowing it a little better than English. Be so friendly as to endorse my prayers to the members of our Society for the indulgence granted me of addressing a meeting of such eminent horticulturists. You must share the responsibility of this step that I have taken, it not being possible for me to refuse your demands, owing your amiability so much. With great respect, G. G. DOPPELMAIR.

MONTREAL, September 7, 1886.

PARKER EARLE, ESQ., PRES'T AM. HORT. SOC'Y—My Dear Sir: Upon my return from abroad, I find your favor of August 23d awaiting me, and I hasten to reply in season to reach you at the meeting of the Association.

I very much regret that circumstances have prevented me from taking an active part in the meeting this year, more especially as there were some matters which I should have brought to the notice of the Association for their consideration and possible action thereon. There is one suggestion that I would give, even now, in the hope that it may not be too late for consideration. You are aware of the very great loss annually experienced by fruit growers, owing to the disorders from which most of our choicest cultivated fruits suffer, and I need not remind you of the very imperfect state of our knowledge regarding the entire subject of vegetable pathology. There are, however, in various parts of the country, men who are giving more attention to this subject, and who, if properly encouraged, would be able to contribute valuable results. Already the experience of peach growers in New Jersey and Delaware encourages us to believe in the highly beneficial results which must ultimately come from patient and systematic inquiry upon a large scale. In my own experience, one of the great difficulties in the way of securing valuable results in such work, comes from the want of living specimens under absolute control of the investigator, and in sufficient quantity to insure reliable averages. It seems to me that the Association can do no better work than in using its influence to promote research in this particular direction, and since the United States Government have given substantial aid for the economic study of injurious insects, and for the study of the diseases of animals—subjects of no greater consequence—I am inclined to believe that a proper memorial from the Association might be the means of securing similar aid for practical study in vegetable pathology. If the Association had funds at its disposal, it might offer grants to competent persons for a term of years, or the Government might do the same; in either case, the distribution of the

grants and the general oversight of investigations to be placed in the hands of a board of three or five members of the Association. It might be well to have the Association appoint a committee, whose duty it shall be to collect evidence relative to the progress of diseases in various localities, and the actual loss thereby incurred, and to embody the same in a suitable memorial to Congress for aid in instituting experiments.

I trust this suggestion may meet with favorable consideration, and that the present meeting may prove highly successful.

Very truly yours, D. P. PENHALLOW.

NORFOLK, VA., September 4, 1886.

MR. W. H. RAGAN, SEC'Y AM. HORT. SOC'Y: Regarding it the duty of every horticulturist to contribute items that fall under their observations calculated to augment the general fund of knowledge aimed at by this organization, will state, May 11th and 12th, 1876, thermometer indicated 30° difference between daylight and warmest time of day. On the 20th twig-blight started upon my pear trees. 1886, May 4th, there was 30° difference within the twenty-four hours, and twig-blight appeared on the 13th. In both of these cases the temperature for two weeks after had similar variations, and the twig-blight continuing through June. Two other years, and about the same time in May, with similar variation of temperature, twig-blight appeared nine days thereafter, but being followed by more even temperature, the twig blight ceased. It has started with me in no other month than May, the 20th of which month is the latest. This is for this latitude. My observations lead me to believe that the sensitiveness of the sap to the temperature does not extend over a period of more than fifteen or twenty days. I suggest that pomologists carefully watch the thermometer at the time of the ascending sap. Respectfully, G. F. B. LEIGHTON.

CHICKASABOGUE P. O., MOBILE CO., ALA., August 9, 1886.

W. H. RAGAN, ESQ., GREENCASTLE, IND.—Dear Sir: The grave illness of my aged mother has prevented my replying earlier to your kind letter of the 16th ult. It would give great pleasure to attend the coming annual meeting of our American Horticultural Society, and I would, if not so completely occupied by the grave duties of attending to the sick, try to prepare a paper on Le Conte Pears; but, under the circumstances, I can hardly allow myself to hope that I can do either. If, however, matters should so change as to allow me to go, I will put in an appearance, in which event I could orally state, with equal effect, all I know about Le Conte Pears. Two years ago Mr. Earle said my orchard was the most beautiful he had ever seen. The oldest trees were then two and a half years old (in orchard). Now I have 1,250 trees. Yours truly, E. M. HUDSON.

CANTON, MISSISSIPPI, September 4, 1886.

PARKER EARLE, ESQ., PRES'T AM. HORT. SOC., CLEVELAND, O.—Dear Sir: After my regrets that circumstances prevent my presence at the approaching meeting of the Society, and best wishes for a pleasant and profitable

time for all present, I wish to ask for a discussion, at this meeting, on the Le Conte Pear. "Are trees grown from cuttings superior in any way to those grown on the European or ordinary pear stock?" This variety has been widely disseminated during the past few years, and it may be worth something to the country at large to have the experience of growers from all sections on this point. At Thomasville, Ga., and vicinity, the growers claim, unanimously and emphatically, that it is of no value on any root other than its own, and grow it exclusively from cuttings, which root quite readily there. They reject the European stock, mainly, I believe, for the following reasons:

1st. Trees on European stocks are liable to blight, while trees on their own roots are exempt.

2d. This stock does not form a perfect union with the Le Conte scion; hence they are liable to break off; they grow less rapidly; they overgrow the stock and become unsightly.

3d. They do not bear well on this stock. And perhaps other reasons also.

Now, whatever may be the advantages of the rooted cutting around Thomasville, they are not so apparent here. With me the union of stock and scion is perfect. There is no overgrowing of the stock. I have small trees both ways in the nursery, and the growth on European stock is equal to that on their own roots. Have trees now bearing in the orchard, on own roots and top-grafted, two and a half to three feet high, on small European stocks. I can see no difference under similar conditions. The growth is about equal on trees of this age, planted fourth year also. The first "count," that is, liability to blight, further time must determine. So far none have blighted. In all other respects, after four years' trial, and with trees beginning to bear, I can see no difference. Now, if the experience of other growers in different sections corresponds with mine, will it not go far to determine one fact, namely, that whatever may be the advantage of the rooted cutting near Thomasville, this advantage is purely local, and should not be claimed as of general application? In furtherance of the position assumed, let me add also that I have been told that *no variety of the European type of pear succeeds near Thomasville*, and hence it is not surprising that in this locality the Le Conte, or any other, should fail on that stock. In other localities, many perhaps, the cuttings root with difficulty, are not a success, and parties wishing to use these trees must pay freight for long distances to get them, when trees equally good could be grown at or near home. This is a fact worthy of consideration. Other considerations of advantage will doubtless suggest themselves if this position be sustained. I hope the Society may deem the question of sufficient importance for discussion, and shall be obliged to you for presenting it.

Very respectfully, etc., WM. H. CASSELL.

P. S. Allow me to add that fruit growing is largely on the increase in our State, and we look for some valuable information from the proceedings of this meeting. C.

DALLAS, TEXAS, September 6, 1886.

W. H. RAGAN, SEC'Y AM. HORT. SOC'Y: I had made all arrangements to attend your meeting on the 7th, but on account of sickness in my family, I am compelled to forego the pleasure and profit of this meeting.

Horticulture in Texas is yet comparatively in its infancy, but its friends are making great efforts to educate the people to properly appreciate the importance and good of this calling. We see in horticulture the means of transforming our broad prairies into vast orchards, vineyards and forests. We wish to educate our people to grow less cotton and more fruits and flowers, thus ministering to the physical and moral development of the millions who will people the vast domain of Texas in the near future. The great diversity of climate and soil in Texas enables us to grow all the fruits adapted to the American continent. All we need to make these broad prairies and valleys fruitful, is to interest our people in this great civilizing vocation, horticulture. Knowing the possibilities of climate, soil and vast territory, the friends of horticulture in Texas are making every effort to develop its resources.

During the last five years there have been organized in our State the following horticultural societies, viz.: The Central Texas Horticultural Society, The North Texas Horticultural Society, The East Texas Horticultural Society, Pilot Point Horticultural Society, and The Texas State Nurserymen's Association. Delegates are now appointed from each of these societies to attend a meeting at Dallas on the 28th of next October, for the purpose of organizing a State Horticultural Society.

Our nurserymen have accepted the generous offer made by the management of Texas State Fair to set aside several acres of beautiful land on their grounds as a permanent horticultural department. An ample sum of money has been appropriated to erect a building and landscape the grounds. The nurserymen have contributed several thousand trees, plants, etc., for the ornamentation of these grounds. It is the aim of the Commissioners of Horticulture to plant on these grounds specimens of every tree, plant, shrub, evergreen and grass that will grow in Texas. Arrangements will be made for a car load of cactus from the western counties. The object of these grounds is to show the visitor specimens of all the tree and plant growth of our State on a few acres.

Besides these horicultural societies and State horticultural grounds, the fruit growers have united in an effort to establish a horticultural department in our agricultural journal, the *Texas Farm and Ranch.* We now have the best horticultural talent of the State interested in this enterprise. We hope from these united efforts to see our people appreciate the profits and pleasure of horticulture. Before I close I must pay a deserving tribute to our fellow-citizen, Mr. T. V. Munson, who has so faithfully represented Texas in your Society from its organization to the present. We are proud of the honor the Society has shown Texas in his election as First Vice-President.

In the name of all the horticulturists of the State, the management of Texas State Fair, the horticultural societies, the Horticultural Department

of *Texas Farm and Ranch*, and in the name of all the people of Texas, I invite your Society to hold its next meeting in our State. If you should conclude to meet in Texas, we pledge the *free use* of the horticultural buildings and grounds of Texas State Fair. To each and every member of your Society we extend a cordial invitation to visit Texas. The horticulturists of our State hang their *door latches on the outside* and you will be welcome. The meeting of your Society here would do much to develop the horticultural resources of Texas. Let the influence of this Society be felt in every section of the Union, especially in those sections where horticulture is in its infancy. The publishers of *Texas Farm and Ranch* will mail your Secretary a copy of their journal for one year *free*.

Wishing you a pleasant meeting, I am yours truly, J. M. HOWELL.

P. S. During the visit of Mr. H. E. Van Deman at our home, last August, the question of naming an *infant horticulturist* was raised. A committee of two was appointed, consisting of Mr. Van Deman and my wife. The report of the committee was: his name shall be Earle Ragan Howell, and was so recorded. We hope he will be worthy of the names. J. M. H.

The President—I will now introduce to you our Secretary, who will present his report.

SECRETARY'S REPORT.

Secretary Ragan, of Indiana—My report will simply be a

FINANCIAL STATEMENT.

Receipts.

From Transactions sold at New Orleans and since	$353 00
From H. E. Van Deman for printing	10 00
From Prof. S. M. Tracy, directory for the year 1884	3 00
From membership and directory fees for 1885	876 00
Total	$1,242 00

Disbursements.

Paid J. C. Evans, Treasurer, membership fees	$250 00
Paid postage on Transactions, letters, circulars, etc	118 16
Paid express charges, freights and drayage	24 04
Paid printing Transactions, circulars, etc	577 50
Paid personal expenses, office rent, etc	80 85
Paid commission on membership fees	16 00
Paid taxes on money of Society	2 33
Total expenditures	$1,068 88
Balance on hand	$173 12

Respectfully submitted. W. H. RAGAN,
Secretary.

On motion of Mr. Hollister, of Missouri, the Secretary's report was referred to an auditing committee to be hereafter appointed.

President Earle, of Illinois—The Seeretary will now read in your hearing a paper by Prof. Husmann, of California. Prof. Husmann was formerly a successful grape-grower of the Missouri valley. He now tells us of grape-growing in the more highly favored climate of California.

PAST, PRESENT AND FUTURE OF GRAPE-GROWING IN CALIFORNIA.

BY PROF. GEO. HUSMANN, OF CALIFORNIA.

I regret that I can not be with you in person at the annual gathering of a Society which I helped to found when we thought the great Mississippi valley was an ample field for a united effort of horticulturists, but which has since extended its usefulness over all the States of the Union. Since we commenced the work of the Mississippi Valley Horticultural Society, in 1879, I have removed to a State on the shores of the Pacific, far removed from you in distance, but which I think pre-eminently the horticultural State of the country, where all the fruits of the temperate zone flourish, together with the semi-tropic, where the apple grows to perfection side by side with the orange and lemon, and where the noble grape grows in such profusion and perfection that the subject which you have assigned to me would seem to be beyond the scope of any man to do it justice. You can, therefore, not expect from me more than a few random thoughts, founded on the experience of but five years, mostly devoted to its culture, but which may serve to show in a measure what has been accomplished in the short space of about thirty-five years.

When gold was discovered in California, during the exciting times of its early settlement, by those who flocked by thousands and tens of thousands over the plains and across the ocean to seek the glittering treasure among its hills and along its streams, but few had an idea that this land, with its rainless summers, would, in the short space of time that has since elapsed, become more famous for its golden fruit and wine than it could ever be by the glittering metal found in the depths of the earth; that its hills and plains, looking so dry and barren during the summer months, would sustain smiling vineyards and trees laden with fruit. It was generally supposed that vines and trees could only live and thrive with irrigation; that the Mission grape, first cultivated by the Jesuit fathers, which even then found its way into the mines, and was readily purchased by the delvers after gold, could only reach its luscious ripeness by being freely supplied with water during the dry months.

From this small beginning, at one location, and with one variety, what a change! Grape-growing has spread over the whole State, until its wine crop—only one of the uses to which grapes are devoted—is estimated at about twenty million gallons this year. From one variety cultivated then we have close to four hundred varieties now, and we already produce as fine wines as any country on the globe. From the few scattering small vineyards then in the State, which were irrigated several times a year, our vineyards now look down upon the land from the highest tops of our mountains, and there produce their choicest fruits, without irrigation, being more secure from frost and other deleterious influences there than in the valleys. Their smiling verdure greets the eye, and is readily distinguished thousands of feet above the valleys. Our raisins are already competing with the finest London layers in the markets of the world, and our table grapes are shipped to every city and town in the Union, while California grape brandy is competing with the choicest French cognacs.

It would lead too far, in a paper like this, to mention the names of those who have lent their aid to reach the results already obtained; nor would it be just to name a few, where so many have helped and labored to bring it about. Our grape growers hail from all countries on the globe almost, and each nationality has contributed worthy members to the ranks of this peaceful army. France has contributed her merry sons and her choicest varieties of grapes; Germany has furnished her patient and thorough going workmen; and the best grapes from the Rhine, Moselle and Nebar, Spain and Portugal, have furnished their best varieties, and Italy has not been behind, while the universal Yankee has helped along with his inventions and his cosmopolitan genius to take advantage of them all. Even the patient and plodding Chinese have helped the "Melican man" more than they generally get credit for to produce the results of to-day. Many of our most industrious and painstaking grape-growers are from Northern Europe, from England, Ireland, Scotland, Sweden, Denmark and Northern Germany.

That thousands of mistakes have been committed in so young an industry is but natural, and would appear self-evident. It takes years of experience in any new business to become at all proficient; and the industry has suffered from the mistakes and been retarded by them. But we know that we have the best climate under the sun to produce a perfect product; we have learned to discriminate in regard to location, soil and varieties, and have learned to handle our products better; we have fewer diseases among our vines; and, therefore, we are convinced that we can furnish the world with better and cheaper wines, raisins, table grapes and brandies than any country on the globe, while our area for successful production is larger than that of France. Knowing and believing all this, I have an abiding faith in the future of California grape-growing. I believe it a profitable investment as long as good grape lands can be bought for $50 to $100 per acre, brought to bearing by $100 per acre more, and will then produce five tons to the acre, at $20 per ton, while it can be cultivated at $20 per acre annually; and it

would be so even at $15 per ton. I believe that our production in ten years from now will be doubled in all branches of grape growing, and that we will then obtain better prices than now, because we will have profited by the mistakes of the past and will produce far better and more uniform articles of trade, which will be presented to the world under their own names, in place of the detestable practice now so often followed, to sell the best under foreign labels, giving the credit of them to other nations, while the poorest are sold as California products, and we are blamed for a l the trash, while the choice goods are supposed to come from France and Germany.

We will have many difficulties to overcome before our State will be recognized and take its place as the best grape-growing country in the world, in quality as well as in quantity. But I am firmly convinced that that time will come, though I may not live to see it, and that California will become, through its influence, not only the most prosperous, but also the most temperate, State in the Union, furnishing her sister States with God's noblest gift to man, cheap, good, wholesome wine.

DISCUSSION ON GRAPES.

President Earle, of Illinois—I am glad the Secretary has secured this interesting paper. It is from an old friend of this Society, and opens up a wide field for discussion.

Secretary Ragan, of Indiana—We have been favored this year with an abundant crop of grapes. It is a rare thing with us to find the markets supplied with this luscious fruit from home producers. Ours is not a grape-growing country, and even this year varieties of the Concord type (it and its numerous seedlings) have done best. We rejoice in the recent honors to Mr. E. W. Bull, the originator of the Concord.

Mr. Green, of New York—Aside from the climate the Californians have another advantage over us in grape growing. Chinese cheap labor to them more than offsets high railroad charges when it comes to placing their fruits in competition with us. The Champion is one of our first grapes to mature, but it is of poor quality. A purchaser rarely ever invests the second time in the Champion.

The President—I see the venerable Mr. Carpenter, one of the oldest grape growers of Kelley's Island, is with us. Will he not tell us what he knows about grapes?

Mr. Carpenter, of Ohio—Mr. President, I am too unwell and hoarse to talk, but not too sick to come here to meet other grape growers and hear them talk.

Mr. E. H. Cushman, of Ohio—I do not wish to take part in this discussion, but simply to invite the Society, at some time during its meeting here, to come to Euclid and see how we, in Northern Ohio, raise grapes. We will, also, allow you to sample our Catawbas, Concords, Brightons, Delaware, etc. I think I can satisfy you all that Buckeye soil will raise grapes. We, too, honor the name of E. W. Bull, who has given us the noble Concord.

Mr. Tryon, of Ohio—Mr. Green slanders our favorite when he speaks evil of the Concord.

Mr. Green—I admit that the Concord of Northern Ohio should be excepted from the charge of inferior quality.

Mr. Miller, of Ohio—The Worden, in my estimation, is much superior to the old favorite Concord. It is fruiting with me for the first time this year. It has been accused of dropping from the stem badly. Is this true?

Mr. Hubbard, of New York—I have been traveling for some weeks among Eastern vineyards, and I find the testimony almost uniformly complimentary to the Worden. I visited the original vine at Mr. Worden's, in Oswego, N. Y. He assured me that it had yielded an average of one hundred and ten pounds for the last three seasons. The crop this year was the finest I had ever seen, and there is no rot. The Concord was not doing well this year, but Delaware and other varieties were good. The Worden is larger, more handsome and attractive than the Concord, and ripens from a week to ten days earlier. I think it clings to the stem fully as well as Concord. Wyoming Red is another especially fine sort.

Mr. Miller—When I first got what I supposed to be Worden it dropped badly, but I soon found that I had been deceived; that it was not Worden, but Hartford Prolific.

Mr. Hollister, of Missouri—The grape crop in our section is poor this year. I am a dealer, and speak from a dealer's standpoint, but I would never advise the planting of varieties that color early and are sent to market before they are fit to eat. Send only good ripe fruit to market if you want to build up a good trade. With us at St. Louis the market is generally broken down by half-ripe Hartfords and Ives before the Concord comes in. I think

from what I have seen of the Worden that it will make its own way into our markets. I would discard Ives and Hartford.

Mr. Greiner, of New Jersey—I have seen the Worden drop badly, but think that the trouble was due to an unhealthy condition of the soil on which they grew.

Mr. Green—The poor man who originated the Worden was laughed at and told that it was nothing but the Concord. The people of this country have lost thousands of dollars by not realizing the difference sooner.

Mr. Albaugh, of Ohio—The grape crop in the Miami Valley has been very fine this year. A Mr. Cramer, of our place, practices sowing oats among his vines, and just before the oats begin to ripen plows them under. He certainly has fine grapes and as certainly believes that it is the oats that prevents them from rotting.

Dr. McKay, of Mississippi—Fruit-growing is rather a new industry in our State. We do not grow grapes very largely, and have not tried so many varieties as you of the North. Some of our folks cultivate the Ives, but we generally think that the Concord does best between latitudes 30° and 35°. This year has been especially bad for the rot. We had a period of almost thirty days of constant showers, which caused all Northern varieties to rot badly. The Scuppernong never fails with us. Great quantities of wine are made from it, but as a table grape it does not rank with your cultivated sorts. I think if we would practice tile draining more than we do it would be better for us. In the absence of this we cultivate all our crops in ridges, for the purpose of giving surface drainage.

Prof. McKay, of Mississippi State Agricultural College—Father is in Western Mississippi; I am in Eastern. Our seasons and soil differ somewhat. A wet June, such as we had this year, is fatal to our grape crop. Our people, as a rule, pay too little attention to pruning and training their vines. We sometimes sow peas among our grapes and turn them under much as Mr. Albaugh speaks of doing with oats. This is a good fertilizer.

Mr. Miller—I have used sulphate of iron as a specific for grape rot, with the most satisfactory results. I use from one to three

pounds, scattered broadcast, about each vine in June or July. My neighbors have also tried it with good results.

Mr. Lindley, of North Carolina—The people of our State are giving increased attention to grape culture. Our territory may be divided into three sections. The eastern section is the home of the Scuppernong. Sometimes one vine of this strictly Southern variety will cover as much as three acres of ground. In the middle section of the State we grow about seventy-five varieties of grapes. This is probably the best grape-growing section of the State. Our best-paying market varieties are the Ives and Champion. The Worden, we now think, will soon supersede them.

Mr. Van Deman, United States Pomologist, Washington, D. C.—I have recently visited Texas for the special purpose of looking after grape-growing in that interesting region. I visited Dallas, Fort Worth, and other points where grapes are grown quite successfully, but I found the chief interest at Denison, where our friend Munson is so intelligently and diligently engaged in improving our native grapes. He has chosen a good field for his operations, as wild grapes of the best quality I have ever met with abound in that vicinity. The Post Oak grapes, which constitute a family of the Æstivalis group, among which may be found some with fruit clusters almost a foot in length, are cross-fertilized by pollen from our best cultivated varieties and in this way Mr. Munson has produced many interesting, as well as very promising varieties. He has already carried this work to the second generation. He studies, closely and scientifically, all the peculiarities of his seedlings, and if possessing any hopeful characteristics, such as drouth-resisting, heat-enduring, prolific bearing, or other promising qualities they are saved for further experiment. If not, they are discarded. Mr. Munson has a worthy associate in this work of improving and developing the good qualities of our Southwestern native species of grapes in the person of Mr. Herman Jaeger, of Neosho, Mo. The intelligent work that these two gentlemen are performing will be fully appreciated by another generation of grape growers, if not by this.

President Earle—I am glad Mr. Van Deman has spoken thus of Mr. Munson. He is one of the most useful men of the present time, through his intelligent labors in the direction mentioned.

Mr. Campbell, of Ohio—Central Ohio is not a noted grape region. We have, perhaps, the best crop this year that we have had since 1849. One peculiarity of this year's crop is the fact that early and late varieties have ripened almost together. The Talman is of poor quality, but, coloring early, as it does, it goes into market when it brings good prices. The Ives is much like it in this respect. They are both too poor to recommend. I was one of the first in our State to try the Worden. It is from ten to fifteen days earlier than Concord, and on this account more valuable, though it has all the bad qualities—tender skin, etc.—of the Concord, its parent. Mr. Munson's labors are of great value to horticulture, and he should be encouraged and rewarded. I know but little of the Post Oak grape of Texas and Arkansas. The Triumph, one of Mr. Munson's bases of improvement, is one of our finest white grapes. It was awarded the premium at the great St. Louis fruit exhibition, under the auspices of this Society, in 1880, as the best table grape.

President Earle—We have with us Mr. Kizo Tamari, of Japan, whom we would like to hear from on the subject of grape culture in that far-off country. Mr. Tamari is the gentleman who represented his country at the great New Orleans Exposition, and has since remained here for the purpose of studying American agriculture and horticulture. We will hear from him again during this meeting on the subject of vegetable-growing in Japan, a subject with which he is quite familiar, as you will then learn.

Mr. Tamari, of Japan—Our people have not given the subject of fruit culture so much attention as you people of America. Indeed, we scarcely use fruits as you do. Garden vegetables constitute the great bulk of the living of our people. Many of the fruits of which you are so fond are not thought to be eatable in our country. We have but two varieties of grapes—one black, the other red. In answering the question, I would say that I do not think they belong to the European species, but more probably to a species of our own country. They are very sweet, with flavor much like your Concord. Grape-growing was but little known until the opening up of our country to foreign commerce. It is now increasing quite rapidly. Wine was unknown among our people until we began to know the outer world. I am remaining in your country for the

purpose of studying your system of agriculture and horticulture, and shall think myself fortunate to have been able to attend your meetings.

As a matter of interest, the Secretary here presents Mr. Tamari's remarks *verbatim.* His imperfect English will only add to the value of his simple statements:

There are two native varieties of common cultivated grape in Japan. Both are called Koshin—of red and white. The name is originated from the district where they are first grown, and where people are dealing with grape culture. There was not one who has half an acre of vineyard outside Koshin, while in the latter about $100,000 were producing annually. The species is not critically studied yet. The grapes are light (?) sweet, no flavor, thin skin, medium size of berry and loose bunch, grow much into vines, were only used for table or in a fresh state, and neither for preserving, wine-making nor drying. I know Chinese make and use wine from many hundred years ago, but Japanese did not. Lately our people have been waken up by the great figure of production from French vineyard, and everywhere talking of grape culture. There are, however, only few who materialize the talking. Government established an experiment station especially for grape culture, and now planted eighty-five acres. A wealthy man started with seven hundred and fifty acres, and planted out over one hundred and twenty-five acres four years ago, when I visited there. The yard is five years old. Those planted at first and second year were found bearing fine bunches. At one time a big association under national term was organized, but nothing is heard of it. The nature of association may not be thoroughly sound, as the case we have usually in such condition of thing.

The plants grown in such vineyards are all European and American varieties. They do very well, except recent outbreak of phylloxera in some gardens. Besides the native grapes above referred to, there are three or four of wild grape growing further north. They are strong and sour.

THE SOCIETY AND THE RAILROADS.

Secretary Ragan, of Indiana—I wish to indorse all that has been said in praise of Mr. Munson and the good work he is accomplishing in the interest of science, as well as of horticulture. He is one of our most intelligent, practical members, and it is a misfortune that he is not with us now, which would have been the case had the railroads shown us such favors as we believe we deserve at their hands.

A Member—Would they not have granted us rates if our Secretary had pressed our claims more vigorously?

Mr. Albaugh, of Ohio—The failure of the railroads to grant us rates has greatly injured our meeting, and I believe, if we go at it rightly, we can yet convince them that it is to their interests to recognize the great industry of horticulture. There is not a railroad in this country which does not realize large profits from the transportation of horticultural products. Societies like this, that are engaged in stimulating the production of fruits and other horticultural products, may justly claim a share of consideration at their hands. I think we should base our claims to reduced rates in attending such meetings as this on the score of justice.

President Earle, of Illinois—I think the action of the railroads in the present case has been hasty and ill-advised, and will be reconsidered.

Mr. Miller, of Ohio—I move that Mr. Albaugh be appointed a committee of one to labor with passenger agents and to try to soften their hearts toward us in the future.

Mr. Hubbard, of New York—I think, myself, that there are scarcely half as many members at this meeting as there would have been had a more liberal rate been granted by the railroads. I shall favor the motion of Mr. Miller.

The motion was adopted.

Secretary Ragan—Mr. President, I have purposely refrained from taking part in this discussion, but as members have pleasantly intimated that perhaps the Secretary might not have done his whole duty in this matter and as by the action of this Society this labor of making rates with the railroads in the future will devolve upon a committee of *one*, which has been most happily chosen, I desire, for his benefit and guidance, as well as for the benefit of the Society, to present a part of the correspondence with various railroad officials which has resulted in our present discomfiture.

On July 5 I wrote Mr. Pierson, of the passenger department of the Trunk Line Commission, whose Secretary replied as follows:

346 BROADWAY, NEW YORK, July 7, 1886.

W. H. RAGAN, ESQ., SEC'Y A. H. S., GREENCASTLE, IND.—Dear Sir: Your favor of the 5th inst., addressed to Mr. Pierson, has been referred to Mr. George H. Daniels, 205 La Salle street, Chicago, Commissioner of the Central Traffic Association, in whose territory your meeting is to be held.

It is probable that he will communicate to you the result of whatever action his committee take regarding your application. Respectfully,

W. DENINIG,
Secretary.

On the same date I also wrote the Assistant Commissioner at Chicago, which elicited the following reply:

CHICAGO, July 7, 1886.

W. H. RAGAN, ESQ., SEC'Y A. H. S., GREENCASTLE, IND.—Dear Sir: I have received yours of July 5th making inquiry concerning reduced rates for the benefit of delegates attending your annual meeting to be held at Cleveland, O., September 7th to 10th, 1886. I will submit your application to the Central Traffic Association at its next meeting, to be held here on the 20th inst. and will advise you of the action taken by the Association.

Very truly yours, GEO. H. DANIELS,
Ass't Commissioner.

Awaiting the action of the Association above referred to the following answer came in due time:

CHICAGO, July 23, 1886.

W. H. RAGAN, ESQ., SEC'Y A. H. S., GREENCASTLE, IND.—Dear Sir: Referring again to your favor of July 5, I beg leave to say that your application for reduced fares for delegates attending the annual meeting of your Society to be held at Cleveland, O., September 7th to 10th, was presented to the Central Traffic Association at its meeting held here yesterday and they declined to make any reduction in fares. Very truly yours,

GEO. H. DANIELS,
Ass't Commissioner.

Not satisfied, I again wrote Mr. Daniels:

GREENCASTLE, IND., July 24, 1886.

GEO. H. DANIELS, ASS'T COMMISSIONER, CHICAGO, ILL.—Dear Sir: I am greatly pained as well as astonished at the decision of your Central Traffic Association. The privileges asked for have been granted associations representing various branches of horticulture, viz.: The meeting of the American Pomological Society at Grand Rapids, last September; the meeting of the American Association of Nurserymen and Florists last month in Washington, etc, and now when the society which *embraces all* of these branches applies, with its membership of over four hundred from all sections of the country, the favor is withheld. We have always received such courtesies heretofore, at St. Louis, twice at New Orleans, at Cincinnati, at Chicago and at Kansas City. I apprehend that you do not fully comprehend the importance of our Society and its worth to the railroad interest or your decis-

ion would have been different. I trust that you can yet adopt a more liberal policy toward our Society. Please notify me at once if such change can be made. Yours respectfully, W. H. RAGAN,
Sec'y A. H. S.

Mr. Daniels replied as follows:

CHICAGO, July 27, 1886.

W. H. RAGAN, ESQ., SECRETARY AMERICAN HORTICULTURAL SOCIETY, GREENCASTLE, IND.—Dear Sir: I have yours of July 24, and in reply beg leave to state that your application was submitted to the Central Traffic Association at its regular monthly meeting, and that, after duly considering the matter, the association, as a body, declined to make any concession in fares. It is not in my power, as chairman of the Passenger Committee, to modify in any way the action taken by the association.

Very truly yours, GEO. H. DANIELS,
Ass't Commissioner.

Feeling that I had fully exhausted all hope of success through this channel, I then wrote Mr. A. J. Smith, General Passenger Agent of the Bee Line, assuring him that, in case his road gave us concessions, a very large per cent. of our delegates from the West and Southwest would come over his line, which letter elicited the following response:

CLEVELAND, O., July 28, 1886.

MR. W. H. RAGAN, GREENCASTLE, IND.—Dear Sir: Arrangements for meetings such as you speak of must be made, necessarily, at the present time, through the Central Traffic Association, who, I am sorry to say, have ruled that no concession should be made for meetings other than religious, educational and benevolent societies. Application was made to our Commissioner before our last meeting for special rates for your Society, and, under the rule mentioned, the association declined to make any concession; consequently, I could do nothing in the matter.

Yours, truly, A. J. SMITH, *G. P. A.*

In the mean time, the good Committee of Arrangements of this city, not knowing just what I had done, notified me, through our friend, A. C. Kendel, that Mr. Lawrence, of the *Ohio Farmer*, would look after the matter of railroad rates, and that he had already written to Chicago, and would notify me of the result. Here is his letter:

CLEVELAND, O., July 30, 1886.

W. H. RAGAN, GREENCASTLE, IND.—Dear Sir: Your favor of the 28th inst. at hand. I wrote to the Commissioner on Traffic urging that he give us low excursion rates to the convention, and inclose you his reply. It

seems that some one had already made application for the same thing, and it had been brought up at a meeting of the association and declined; so that my application was useless.

Very truly yours, M. J. LAWRENCE.

Now, Mr. President, I only wish to say that, notwithsanding the known non-"religious, educational or benevolent" character of a modern base-ball club, I noticed as I came in over the great Bee Line road, out for a number of miles from this place, posted conspicuously, that half-fare rates were offered to people of all sects, standing and complexions to attend a great base-ball contest to take place in this city next week. I suppose that a well regulated horse-race or prize-ring contest would receive the same consideration as the base-ball club does.

President Earle—I will now read in your hearing an interesting letter (for it comes in the shape of a letter) from our Vice-President for the State of Florida, Mr. Edmond H. Hart, of Federal Point. I wish Mr. Hart could be here to read it in person.

NOTES FROM THE EXTREME SOUTH.

BY E. H. HART, OF FLORIDA.

W. H. RAGAN, ESQ., SEC'Y OF AM. HORT'L SOC'Y—Dear Sir: I have just received your note, stating that Florida still remains unrepresented on the programme of your September session at Cleveland. A few words, therefore, from this far-off corner of the Union, towards whose sunny shores so many steps and faces are turned when the "Blustering railer, rude Boreas," pipes his piercing bellows from the summits of the Arctic bergs, may not be uninteresting.

Do not, I beseech you, champions of Flora and Pomona, look with disparagement upon our State, which, although one of the first to be trodden by European feet, is yet but an infant in all the essentials of horticulture, except those which kind nature has bounteously provided. For centuries the foot-ball of nations; pointed at with scorn by statesmen like John Randolph, of Roanoke, who preferred the fire and brimstone of Gehenna to her swamps and alligators; maligned and misrepresented by many, and distracted by dissensions and foreign and domestic warfare. It is but a score of years since she has emerged from those blighting shadows to a period of that peace represented in scripture as the acme of human felicity in temporal affairs, when "every man can sit under his own vine and fig tree, with none to molest or make him afraid."

With a soil and climate admirably adapted to commercial and decorative horticulture, needing nothing more than the application of fertilizers and skillful manipulation—for, thanks to a kind Providence, the early and the later rains have never yet failed us—our progress in this most gentle and ancient of all sciences ought to be correspondingly rapid, but I am constrained to say that even a beginning has scarcely been made. A few small local societies, the upholding interest in which is social and convivial, rather than scientific, are about all the horticultural mouth-pieces to which we can point. This seems all the more incongruous when we reflect that in no other new State has flocked so large a percentage of educated and cultured people, many of whom have been drawn southward by the æsthetic idea of escaping the asperities of northern winters, and revelling in a balmy atmosphere, surrounded by fruits and flowers. This class certainly is not lacking in enthusiasm or appreciation, and evidently what is chiefly needed to promote the science of horticulture in Florida is the active organization and well directed aims of societies devoted to this object, which will impart information and encourage effort by liberal premiums.

Depending largely, too, as we do, upon the influx of winter visitors, who come among us to enjoy themselves and spend their money, sagacious policy, if nothing else, should teach us the importance of enhancing our natural attractions by the artificial embellishments our guests would so greatly appreciate. We have no lofty mountains, majestic cataracts and stupendous gorges to stir their souls, and about all we can boast of in the way of scenery consists of the variety and beauty of the vegetable kingdom, capable of infinite development, and which if swept away would leave the land a monotonous and dreary waste.

Charles Kingsley says: "When, in some future civilization, the art that has produced an average English park, shall be brought to bear on tropic vegetation, then nature will produce such effects of form and color around tropic estates and cities as we can not fancy for ourselves. A hundred plants of yellow allamanda, or purple dolichos, or blue clitoria, or crimson norantea, set side by side, will carry up the forest walls and over the tree-tops, not square yards, but I had almost said square acres of positive color. I can conceive of no limit to the effects—always heightened by the intense sunlight and the peculiar tenderness of distance—which landscape gardening will produce, when once it is brought to bear on such material as it has never yet attempted to touch, save in the botanic garden at Trinidad."

Fortunately, we are not obliged to grope in the dark. The Societies of the older States, like sturdy pioneers, have cleared the way, leaving a fair and open path for us to follow. We can but look with admiration upon such time-honored Associations as that of the old Bay State, which, even in her rugged soil and rigorous climate, has wrought such grand results. The pattern and parent of a numerous progeny, its influence is powerfully felt, not only here in Florida, but in the remotest parts of the Union.

The fascinations of orange culture, and the necessity to many of our set-

tlers of speedy and substantial returns, have had much to do with the neglect of other branches of gardening. When this industry, from increased production, loses its speculative and all-absorbing character, many will look in other directions for a source of revenue, and as wealth increases ornamental horticulture will receive special attention. There is no reason at present, but the solution of the problem of speedy and safe carriage, why cut flowers should not be extensively grown in Florida for sale in northern markets, just as they are in the southern provinces of Europe. Also a satisfactory beginning has been made in the distillation of perfumes from the orange, jasmine, tuberose and others, whose delightful fragrance the belles of fashion have always sought to capture and hold imprisoned in their dainty garments.

Your favorite pursuit last winter received in this State a stunning but fortunately only temporary blow in the shape of the most protracted and well-nigh the most severe visitation of freezing weather on our records. At one time it looked as if even the orange trees must go, and nothing but the condition of absolute rest into which they had lapsed from previous cool weather could have carried them safely through a continuous freezing temperature of four days. Frost was felt throughout the entire State, of course with diminished severity in the lower portion, and sad havoc was made among the strictly tropical growths, most of which were either killed outright or back to the root. At present the traces of this frost are nearly obliterated under a luxuriant growth of fresh foliage, induced by the timely and copious showers of the past summer. Experience has taught that no recuperator of frosted trees equals a superabundance of moisture; and in addition to the recovery of the trees, there is promise of a fair crop of fruit.

Extending, as our peninsula does, fully four hundred miles from north to south, she possesses two climates, the sub-tropical and the tropical. In the southern portion, frost being practically unknown, coming so lightly and so seldom as to be one of the "unconsidered trifles," the range of products will be of course very extensive; but this portion is very sparsely settled as yet, and therefore almost entirely undeveloped. I am glad to say that through the exertions of several enthusiastic young men, who are importing and planting seeds from all quarters of the tropics, both of shade, fruit and flowering trees and of useful plants, there will soon be an extensive list of exotic growths naturalized within our borders. Most of the strictly tropical fruits flourish well in South Florida, and ere long many tracts now buried in dense hammock or studded with stately pines will be changed as by the wand of a magician into gardens of waving palms, mingled with the evergreen foliage of the orange and citron, the lemon, mango and banana, and a host of others whose names are more grotesque and outlandish than musical, but whose fruits are a surprise and gratification to an unprejudiced palate.

Hitherto the course of empire has moved westward till checked by the waters of the Pacific, and now what remains for it but to flow southward? There is room for expansion in this direction for generations, perhaps centuries to come, and who so bold or sanguine as to forecast a teeming popu-

lation all the way to the Rio Negro of Patagonia? And when people migrate southward, history tells us, they never come back. Perhaps they perish of those dreadful bugbear diseases that are currently associated with equatorial regions, or partake of the lotus and subside into a state of "masterly inactivity," or *dolce far niente*, or something of the sort. Let us hope that under the stimulus of our free government the northern energy may not be quenched by translation to a more ardent clime. Those savage hordes that swept down upon Italy and Northern Africa in the decline of the Empire stayed there, and their fair-haired descendants are still to be found in Spain and on the borders of the Saharian desert.

But what, you will say, has this apparent digression to do with horticulture? It is introduced partly as an interlude or variation, like the flourishes of a musician, to relieve the monotony of my theme, and partly as bearing on the manner in which we may expect accessions to our future grand army of gardeners. Manifest destiny is a favorite theory with some people, and the manifest destiny of Florida is doubtless to become a community of horticulturists, although she has made such a sorry beginning.

Members of the American Horticultural Society, let me tender my congratulations for the broad field you occupy, and my hopes that you will till it well. Horticulture includes pomology, although pomology does not necessarily embrace horticulture, at least it was so decided during the session of the American Pomological Society for 1879. Some who were present on that occasion may recollect how Mr. S. B. Parsons, of Flushing, whose life has been devoted to horticulture, and whose utterances are not *sub rosâ*, but "on the Rose,"* proposed that the objects of the Society should be extended so as to cover his speciality. Some of the steady old conservatives objected, lest in their enthusiasm for horticulture—how candid thus to acknowledge their own weaknesses!—pomology should be neglected and left to languish, and so the motion was tabled. And it remains to be seen whether, in spite of the warning of scripture, you can consistently serve two masters, Horticulture and Pomology, and treat each with impartial consideration.

I hope you will pardon the vagrant and desultory character of my remarks, which, after all, you must allow are in keeping with the subject, for Florida is a big State, and you may ramble about in her a great deal just now, and find but little to say of her horticulture, except in prospective, and this I will leave for a future occasion, letting "the morrow take thought for the things of itself."

In conclusion:

With greetings as warm as our summer sun,
And hopes for your future as bright,
Please accept the regrets of your servant as one
Who can not be with you to-night,

or to-day, as the case may be. And if perchance, old age, or malaria, or

* Parsons on the Rose.

physical imbecility, or a scolding wife, or any other of the ills that flesh is heir to, should beset you, my best advice is to come to Florida and bathe your troubled spirits in the Lethe of forgetfulness.

At the close of the reading of Mr. Hart's paper, which was well received, the Society adjourned to meet at 8 o'clock P. M.

First Day—Tuesday.

EVENING SESSION, September 7.

At 8 P. M. the Society reassembled in the Board of Trade rooms, President Earle in the chair.

After a few brief introductory remarks by the President, his Honor, Mayor Gardner of the City of Cleveland, delivered the following

ADDRESS OF WELCOME.

Mr. President, Ladies and Gentlemen: Through the kindness of your local members, I am permitted to meet with you to day, and to express in behalf of the citizens of Cleveland gratification that you have selected our beautiful city in which to hold the seventh annual meeting of the American Horticultural Society. As I have no desire to enlighten you upon the extent of my ignorance in matters horticultural, there will be no personal effort, either verbally or by written essay, upon that subject. But I may be allowed to say a few words commendatory of your Association and the reason therefor. You, gentlemen and ladies, have organized in the interests of promoting horticulture, which latter I understand to mean tilling the earth so as to produce the best results in the form of fruit, food, and objects of beauty from the vegetable kingdom. Many of you having given years of investigation to this interesting creative study, are well informed concerning fruits, flowers and forest trees, and as to locality, climate and soil, how to prepare the latter to best propagate—when, how and what to plant so as to produce the greatest and best varieties, and the most pleasure and profit, and the best means to protect, preserve and dispose of products. I take it that plants are like people, liable to suffer and to starve unless a wise, intelligent care is exercised, that they may grow to a life of usefulness. As you have assumed the burden, the responsibility rests with you, and I haven't the slightest doubt of your ability to perform the obligations. Your work, to a large extent at least, is a work of charity, and from your wisdom comes a beneficence of the greatest importance, for anything that is done, resulting in perfect and abundant soil products, must lead to great good to the human family, and continued experiments in this direction can not produce other

than delight to pure minds and the sense of sight and taste. It must be a sad void in human existence, and a serious drawback to the progress of our country, were the interests of such a valuable and necessary matter as horticulture allowed to be neglected. Those who regard the beautiful in fruit and flowers as indispensable, and the poor whom we have always with us, would be deprived of pleasures and edibles which oftentimes displace and are a substitute for that which is more expensive and less healthful, and landscape improvement, combined with nature's architecture, is so often more beautiful to the eye than artificial civil architecture, that the latter, in its most perfect form, would be incomplete without the former. Organization for honest purposes, for mutual benefit, can not be disastrous, and though you have within your association in addition to horticultural interests large and varied commercial pursuits, no one can possibly become a controlling faction, for the reason that none are independent, but each must depend upon all the other interests; therefore coöperation is necessary and leads to profitable success. There should be, and I believe will be, no lack of energy in sustaining and carrying on the objects of your Association so that as a whole the best results to all mankind will be assured. It is through efforts made by association that horticulture has been brought to its present high standard. I sincerely hope you may increase in membership and corresponding usefulness, so that the great enterprise which occupies so much of your valuable time as an organization will insure further and continued benefit to all people. You are entitled to all consideration, and especially should you receive substantial aid and encouragement from respective states and the general government. To you who are constantly and so scientifically studying the instructive, interesting problem in horticulture and its kindred co-interest, I tender personal wishes for unlimited success, and will assume, in behalf of the people to thank you individually and collectively for the work you are performing in such an unselfish manner. As an official of this municipality it gives me great pleasure to extend a cordial welcome to each and every one of you, and express the hope that your visit will prove to be as pleasant and agreeable to you as I know it is fully appreciated by our citizens.

President Earle thanked the Mayor for his cordial words of welcome, after which he proceeded to read his annual address, as follows:

PRESIDENT EARLE'S ADDRESS.

Ladies and Gentlemen, Members of the American Horticultural Society:

It is with much pleasure that I greet you to-day in this seventh meeting of our Society in the enterprising, hospitable and beautiful city of Cleveland. We are glad to meet a second time in the great State of Ohio—a State which is great in all the industrial interests of the time, great in agriculture and great in horticulture. And we are especially glad to shake hands in this

city so happily planted on the shores of an inland sea, with its grand environment of vineyards and orchards and gardens. For wonderful as has been the growth of Cleveland as a manufacturing and commercial city, its horticultural interests have kept even pace, until it has become famous as the centre of a rapidly-expanding garden industry, and celebrated the world over for the almost unrivaled beauty of some of its streets, which illustrate so well the possibilities of horticultural adornment in America. We meet in a town full of enterprise, full of intelligence, full of culture, and full of horticulture.

Our last meeting was held close by the shores of the Gulf of Mexico, in a city abounding in semi-tropical luxuriance and perpetual vernal beauty, in connection with the most extensive and most comprehensive exhibition of horticultural products ever made in the world—

AN EXHIBITION WHICH WE HAD CREATED,

and surrounded by all the vast appliances of that greatest of industrial exhibitions—the World's Exposition in New Orleans. From the protracted labors—for so many of us—connected with that exhibition we have taken a long respite, and can now calmly review that work of many months, and estimate its value. And now as I look back upon that exhibition across a distance of eighteen months, with its fifty thousand plates of fruit gathered from over fifty States and nations, from all the climates of the world and all the seasons of the year; with its ten thousand transplanted forest, fruit and ornamental trees representing eight hundred species; with its strange flora from tropic wildernesses and sterile deserts mingling with the cultivated plants of Europe, Asia and America, I re-assert my belief that you who shared in this great labor, and all horticulturists who witnessed its results, will join in the opinion that the work which this Society did in organizing the International Exhibition of Horticulture at New Orleans constituted the most notable horticultural event of modern times.

This Society was first organized to meet the wants of the fruit-growers, gardeners, forest growers and lovers of rural art in the States of the Mississippi Valley. But horticulturists from most of the States of the East and of the West soon came to us for membership, and they asked us to extend our territorial limits to embrace all of the horticultural interests of the continent, from ocean to ocean. After much deliberation, this was done at our large meeting in New Orleans, so that we are now in name, as we had been for years before in membership and in the spirit of our work,

AN AMERICAN SOCIETY.

At one of our earlier meetings a good friend and eminent worker for horticulture asked, in a somewhat critical spirit, "what excuse the Mississippi Valley Horticultural Society had to give for its existence." I believe, gentlemen, that the excuse has been rendered, informally, but sufficient in itself

to answer our friend. It is quite possible that this same earnest and excellent questioner, or some other one, has asked, or may ask us again, what reason we have for being a National, or rather an American Society of horticulture. Let us hope that the future work of the Society will fully justify its being here, with its great name, bearing the flags of two Nations in its hands.

The need for, and the possible usefulness of large, far-reaching societies is very apparent. The reason is of the same kind, but larger, as the reason for the existence of any societies at all. Societies bring people together for the comparison of views, and the enlargement of views. The local society gathers and formulates the experience and wisdom of the community. The county and district associations have their larger important work. The State societies stimulate and organize and give direction and tone to the civilizing work of horticulture in whole commonwealths, and great States feel and exhibit the enobling results of society action. There is scarcely a State in our Union whose whole industrial development, whose entire civilization to-day does not show the deep imprint of organized horticultural activity.

IT IS SEEN IN BENDING ORCHARDS,

in burdened vineyards, and in fruitful gardens. It hangs banners in every park of town or city, and sings pæans in groves and forests planted by man or saved from the woodman's axe. It babbles in fountains built and in brooks preserved, and its beauty shines on ten thousand green and shaded lawns, and in every window where flowers bloom and vines clamber. If you could take out the influences of horticulture from the structure of our civilization, you would have left a system of bare walls, hard forms, and coarse living, in whose presence we should be strangers as in an unknown world.

But should the beneficent results of horticultural organization stop with State lines? As long as our interests and our needs reach out in all directions through the land; as long as our lines of commercial interchange, for the products of horticulture, as well as for the yields of the loom, the fruits of the forge, and the creations of the brain run in all ways across the continent, from the sea to the sea, and from the tropics to the frozen zone, will societies which bring us into larger acquaintanceships, which inform us of larger conditions, which stimulate us with new inventions, which tempt us with new successes, and which in every way enlarge the horizon of our intelligence, be found useful and more indispensable to the horticulturist, as to the man engaged in any great work.

We are constantly dealing with new factors in horticulture. We have new avenues of exchange; we have new plants, new flowers, new fruits; we have new diseases, new insect enemies, new surprises of climate; we find new adaptations for old things, and our old plans broadening out into a hundred new channels. All these ever-varying and ever-enlarging conditions of our old institution of horticulture, challenge us all who would be live men in managing horticulture as a business, or its successful apostles as a refining

social power, to adopt every agency for the enlargement of our knowledge of the facts surrounding us, and of the wider relations to which our interests extend. There is perhaps within our reach no single agency which does so much to quicken investigation, to bring into public view the results of individual research, and so to enlarge the realm of our knowledge, as the organized societies of the time. This is true in every field of moral, social, or scientific work. It is no less true in the domain of horticulture. Horticultural societies have made horticulturists, and have made horticultural literature.

HORTICULTURE IN THE LARGER DEFINITIONS WHICH MEN GIVE THE TERM COVERS A WIDE FIELD.

It has outgrown the restricted definition which confined it to the cultivation of a garden. For as Lord Bacon has defined gardening to be "the art which doth mend nature," the modern horticulturist has taken for his task all of the sciences and arts which relate to the garden, the orchard, the vineyard, and to the forest which stands behind and protects all these. The word relates to all that embellishes the home, the farm, the public highway or public park; and to all that affects the great industries springing from vineyard, garden and orchard. There are great, noble, and most useful societies of the broadest scope devoted to each of the specialties which together make up the system of horticulture. These societies embrace many of the most noted and most noble workers of our time. But as all of these special interests interlace and overlap each other, there should be some ground common to all of them, where all may mingle and in many ways do each other good. That common ground is the horticultural society, whose sympathies reach out and embrace them all.

Stated in a general way, horticulture has

ITS ÆSTHETIC SIDE AND ITS ECONOMIC SIDE.

Which has been developing the most rapidly in the last quarter of a century it would be hard to say. But both of these branches have had an unfolding in this country that is quite unparalleled, and would seem marvelous if we did not live in the necromantic age of steam and electricity. We older people remember how bare and lean were the surroundings of ninety-five per cent. of American rural homes thirty or forty years ago; how their unshaded and weather-beaten sides met all the assaults of the sun and the shock of storms without the intervention of screen or tree, and how, if there was a bed of flowers about, it was bashfully hidden in some corner, as if afraid of getting in some one's way—save only the unblushing hollyhocks, which in solid phalanx near the front door sometimes defied all rebuke!

If you travel over New England or the Middle States or the broad plains of the West to-day, and count the thousands of mansions, villas and cottages, in suburbs, in towns and on farms, which are embowered in shade and sheltered from winds, with bright lawns and blooming flower beds around

them; if you will consider the sheltering roadside maples, the shaded school house grounds, the hundreds of handsome parks, and how everywhere the love of beauty in the soul of man and woman is in full blossom in tree and plant, in lawn and architecture, you will be certain that the æsthetic side of our horticultural education has been advancing at a wonderful rate. And this is the side of it that is undoubtedly of the most importance to the interests of the people; for far more is it essential that the love and longing for beauty in the hearts of men be stimulated and gratified than that we should have great variety on our tables or profits from orchard or garden in our pockets.

On the æsthetic side horticulture allies itself with all the good influences which elevate the race. It co-operates with education, with art, with moral culture, with religion, in expanding whatever is pure and best in human nature. On its economic side it is growing into some of the large industries of the time. Consider what a business the culture of flowers has become within a generation. The commerce in cut flowers alone amounts to millions of dollars annually in some of our great cities; and flower culture as a business is growing rapidly in all of our American cities. Large capital is invested in it, and tens of thousands of persons earn their daily bread in producing and vending products which minister chiefly to the sense of beauty.

A HISTORY OF THE NURSERY BUSINESS IN THIS COUNTRY WOULD BE FULL OF SURPRISES.

Think of the days when that quaint missionary of horticulture and religion, "Johnny Apple-Seed," wandered through the wilderness of Ohio, scattering benedictions from his generous pockets. He was a veritable prophet of the great nurseries and orchards of to day. He is, perhaps, the most romantic figure in horticultural history. We only know him under the odd sobriquet which the rustic speech of that day gave him, but that name should be mentioned with reverence among the benefactors of the West; and the horticultural State of Ohio, whose orchard products have been estimated at ten millions of dollars of annual value, would do herself honor by somewhere building a suitable monument to the memory of one who, while he was scattering fragments of religious books among the pioneers of a new land, planted apple seeds in every favoring spot.

A half century since how few and small were the American nurseries, while now the great nurseries are numbered almost by the hundred, and the small ones no man has counted. And each one is fostering the infant stages of landscape and floral beauty, and the germs of golden orchard harvests in the future, or of forests that shall shelter and protect a needy land. The business of the nurseryman has become one of great magnitude and commercial importance, and upon its continued growth and prosperity depends much of the happiness, the civilization and the future glory of the American States. All honor and profit to the energetic men who have built

up this noble business, and who are making this happy country of ours the most fruitful and the most flowerful of any land under the sun.

Perhaps no industrial expansion of the time shows more remarkable results than the business of

AMERICAN FRUIT CULTURE.

A single generation has witnessed a revolution in the habits of living of the American people. The rare luxuries of thirty years ago have become the every day necessities of American tables, and the health-giving and refining influences of general and abundant fruit supplies are working their noticeable effect upon the physique and character of the nation.

Thirty years ago the daily receipts of strawberries in the city of Chicago—now the second greatest fruit market in the world—could all have been carried in one wagon at one load, and it would not have been a large load either. Now whole railway trains are engaged to carry the daily supply of that market, which often amounts to three hundred tons, and sometimes to twice that quantity. A similar increase of supply has taken place in most of the markets of the country. The production of the Wilson strawberry was the beginning of a new era in strawberry culture, and I may add of small fruit gardening; for all branches of the business have been stimulated and carried along by the tide of enthusiasm which has planted strawberry fields all over the continent, and covered the tables of the rich and of the poor alike with their dishes of fragrance and crimson beauty. Thirty or forty years ago it would be safe to say that all the strawberries marketed in one day in the United States could have been gathered by a force no larger than I have seen bending over the smiling rows of a single plantation. Now there are probably not less than a quarter of a million harvesters engaged in gathering this delightful fruit for market growers. Then the season of this fruit was limited to the three or four weeks of its ripening in each locality; now, by the help of railways and refrigerator transportion, it extends over four or five months of the spring and summer, and strawberries are sometimes transported a distance equal to that from the Atlantic to the Pacific seas. Thirty years ago the supply of peaches for that same wonderful fruit market of Chicago nearly all came from one orchard, and that not a large one. That orchard has long since died, and its successors have grown and borne and died; but it now takes contributions from all the orchards of the South and West and on the shores of the great lakes, from the fruitful Delaware peninsula, and from the distant valleys of California, to supply the Chicago market and its dependencies with this one most delicious fruit of summer.

How much more than a generation since was it that the principal

VINEYARDS OF THIS COUNTRY

Clung along a few miles of bluff on the Ohio river? There was then no good grape which the people generally could grow. But a great want brought its

remedy, as it often does. The occasion brought the man. The man lived in classic Concord, where so many good and wise men have lived. For there a sagacious, patient experimenter produced from the native wildings of Massachusetts that most valuable grape for the millions, the magnificent Concord. May perennial honors crown the good gray head of the producer of the Concord grape, and of all such unselfish benefactors of the race; for millions of people now eat grapes grown on their own vines that could not have done so but for such a labor. With the introduction of the Concord a new era in grape-growing was begun. Concord vines were planted in the East and in the West, in the extreme South and in the extreme North. Farmers and villagers and the crowded denizens of cities planted grape-vines; they not only planted the vines, but they gathered the shining clusters of fruit in town and country, on hill-side and plain, all over this broad land. Stimulated by this great success, a hundred others have produced good grapes of every complexion, variety and quality under the sun; and there is no locality so bleak or so barren but can select one or more varieties of American grapes which will flourish under its peculiar conditions. So good grapes can, with a little simple care, be everywhere grown, in all the States and Territories and Provinces of the continent, and by every person who owns a rod of land—good, ripe, sweet, beautiful grapes that shall gladden every home.

And so, by the persistence and devotion of horticulturists this great land has

BECOME FULL OF FRUITS.

They are everywhere at all seasons, and within the reach of all. Few tables need go without them, and few mouths hunger long for them, for they have become cheaper than bread and meat in most of our markets.

And yet it takes toil and skill, and the patient attack of many difficulties to produce good fruits, and to make them abundant. It seems to have been determined by Providence that the conquests of man over nature may become very complete, but that the varied labor of these conquests shall develop and educate every faculty of the man himself. We can not reap the golden harvest of orchard and vineyard without we have been found worthy in the patient labor and skill with which we have met and overcome the endless difficulties which hedge them round. For successful horticulture illustrates anew the old "irresistible conflict" between good and evil. Very luckily for the general good, the pursuit of our art carries with it a certain fascination for its devotees—it generates an enthusiasm which pushes its followers along over every frowning difficulty, until the amount of our accomplishment is sometimes greater than we desire, or than is profitable to ourselves. Many as are the enemies to conquer in every line of horticultural effort—and sometimes it seems as if all the forces of nature were combining against our success, when insects deface and blights wither and drouths burn and frosts destroy—yet the ingenuity, the energy, the enthu-

siasm of the horticultural producer are found sufficient in most cases to overcome all obstacles so far as to provide enough, and too much. In fact the difficulties of production have been so far overcome that most branches of the business *seem* to be suffering from *over*-production.

Looking at this question from the stand-point of a commercial grower of fruits, it appears to me that one of the chief problems for our fraternity to solve is

HOW TO DISTRIBUTE OUR PRODUCTS MORE PERFECTLY—

How to reach wider markets. This involves superior methods of handling and packing, and superior means of transportation. There is, as yet, no absolute over-production of good fruits; but there is defective distribution. There were not too many apples grown in New York and Michigan and Missouri last year, although apples sold in many of our large markets for prices far below the possibilities of profit; but our system of distribution left half of the families in America with few or no apples to eat all last winter. When one or more barrels of apples go into each farm house and each laborer's cottage all over the South, to each miner's cabin among the mountains, and to all the new homes building on the wide plains of the West, the supply of apples will not be found too large. There have not been too many oranges grown in Florida and California for the last few years, though many orange growers have got little profit from their crops; for three-quarters of the people within a practicable commercial distance of these orange orchards have eaten almost no oranges in these years. If all the American people were to eat apples and oranges daily in their season the quantity produced would not supply their wants. A more thorough system of distribution with the improved transportation facilities now at command will render this approximately possible. There is no fruit produced in our country so tender or perishable but that it can be carried and marketed half way, if not all the way across the continent, when the best facilities are used; while our most important fruits can successfully be placed in the great markets of Europe.

Hence it appears to me that we are not producing too much,

BUT ARE MARKETING TOO POORLY,

And that the question of the distribution of our horticultural products is the one most important to the commercial grower. Its successful solution will result in infinite benefits to the people who consume, and in living profits to the often-discouraged class who produce. This problem, together with those relating to the difficulties of production, will keep every fruit-grower wide awake and on the alert, who attempts with some spirit to master the business which he has adopted. There is no obstacle in the way which energy—intelligent energy—can not overcome, and I confidently expect to see the schemes of distribution, preservation and marketing now in progress so far perfected that every worthy

fruit-grower will be constantly challenged by the profits within his reach to do better work and to master the difficulties of his situation.

It is with much pleasure that I recognize the improved relations between the horticultural fraternity and that

DEPARTMENT OF THE GENERAL GOVERNMENT

Which touches our immediate interests. It was with peculiar satisfaction that I saw the present administration call to its aid, in the Department of Agriculture, a leading member and founder of our own Society—a gentleman of such eminent ability and knowledge in all lines of agriculture and horticulture, and one possessed of such enthusiasm for all good work—as is our distinguished friend, the Commissioner of Agriculture. Governor Colman's work in the department demonstrates, what we all believe of him, his eminent fitness for the office. And what he has done shows that he does not forget any of the interests of horticulture. He is originating new methods of helping our cause, and he asks his old friends for such suggestions as he can make useful. It seems to me a fortunate time for us to ask the aid of the Government for certain important matters which can not be accomplished without its powerful assistance. Now, while we have a "friend at court," of whose sympathy and influence we are sure, it is a favorable occasion for us to consider these questions.

A good beginning has been made in the creation of a

DIVISION OF POMOLOGY

By an act of the last Congress, but no sufficient provision was made for its establishment upon a comprehensive working basis. It is evident that the extent of the useful work which such a bureau could do was never considered by Congress, as but little can be accomplished with the small sum appropriated. In a country whose annual production of fruits exceeds a hundred million dollars of value, the helpful work which such a bureau could do would abundantly justify a liberal expenditure for its maintenance. For instance, the establishment of a system of fruit crop reports, covering our whole territory, to be tabulated and sent out monthly, or oftener, would have exceeding value for all fruit-growers, and for all who are commercially interested in our pomological harvests. We have long needed such a system of reporting. It is almost indispensable to any intelligent handling of the crops we grow. But such a system can not be established outside of a Government bureau. This is but one of many useful services which a pomological bureau could render, if it was well endowed and well directed.

The establishment of Experiment Stations in connection with, or under the direction of our agricultural colleges, is another work, important alike to every interest of both agriculture and horticulture, which the Government should not longer delay the commencement of. An excellent bill covering these wants was before Congress last year, which I think had the

general endorsement of our agricultural colleges and societies. What can we do to help this measure along?

We need a more thorough research than has yet been possible into the conditions surrounding successful fruit culture in

RUSSIA, CHINA AND OTHER INTER-CONTINENTAL COUNTRIES,

Whose severe climates correspond to our own interior climates, which, as we know, prove disastrous to nearly all varieties of fruit originating in countries under the influence of the sea. The fruits of Central Russia have endured the test of centuries of winters and summers, worse, perhaps, than our country can parallel, and they are grown in great quantities in a latitude six hundred miles farther north than that of Quebec. And there, almost under the Arctic Circle, has been building up through hundreds of bitter winters and arid summers a race of fruits from which all weakness has been bred out, the fittest qualities only surviving. If these varieties are not all, or many of them, as good in quality as our modern tastes demand, they at least will furnish the foundation for new and hardier races of fruits that will withstand the trying climatic vicissitudes covering half of this continent, under which our older varieties can not be successfully grown. Is there any pomological question more important than this? We want to know more about Russian and Asiatic fruit culture. We want to know all about it that years of investigation, by a competent commission can secure. This is certainly a work for the Government to undertake. The work has been nobly begun by the enterprise of two honored pomologists, whose labors can not be too highly commended, for Mr. Gibb and Prof. Budd have already given the country a service which entitles them to great honors. The Government should take up and complete their work.

But the most important subject to which we can call the attention of the Government is

THE WORK OF FORESTRY.

This is the one grand question that overtops all other questions of public economy to-day. The rapid destruction of the vast forest areas of this continent has unbalanced the forces of nature. Our seasons have changed their temperate courses. Destructive floods are followed by consuming drouths. Our crops become more uncertain. Our climate becomes full of extremes. The situation is one that challenges the attention of every thoughtful man, and that every year of timber waste makes worse. The forests of Europe, so far as saved at all, have been largely preserved and built up by the strong arm of the Government, and we must look to the State Governments and to the National Government for the saving and the upbuilding of our forest interests. What woodlands we have should be preserved by absolute force where the Government has the right, and by all encouraging legislation where it has no control; and by every possible measure, State and National, should forest planting be encouraged. There are very few, if any, of the

States but what have passed the limit of safety in the work of deforestation. I can not here argue this question at length, but a single fact will illustrate the imminent necessity for action. This State of Ohio where we meet to-day in 1853 had 54 per cent. of its surface covered with forest; in 1884 but 17 per cent. of the area remained in timber. Thus in a single generation two-thirds of all the forest in existence at the beginning of the period had been destroyed, and but one-sixth of the surface of the State is now protected by the garments with which God covered these hills and plains.

DO YOU WONDER THAT THE VALLEY OF THE OHIO IS ALMOST ANNUALLY DESOLATED BY INUNDATION?

That climates change, and always for the worse? That winters are harder, and summers hotter, and drouths more destructive? Do you wonder that there are no more sparkling brooks that run and sing all summer, but only muddy torrents and the dried-up beds of streams? The great conservative equalizing power of the forest is gone. The State of Ohio would seem to be making hasty strides toward the agricultural condition of Arabia. And Ohio stands for America. I quail before the inexorable penalties which nature has in store for all States and peoples who will ruthlessly destroy so glorious a heritage of forest as the American people once possessed. Without forests no successful agriculture is possible, and no high civilization can be maintained. It surely becomes the duty of every intelligent citizen to use all available influences through State and National legislation, and by the diffusion of light among the people, to save what remains of our American woodlands, and to grow new forests over the vast treeless plains where they are both an economic necessity and an indispensable factor of a profitable agriculture.

The address of President Earle was received with applause, whereupon Mr. Campbell, of Ohio, moved that it be referred for special consideration to a committee, to be reported upon during this meeting.

Mr. Hollister, of Missouri, seconded the motion, and suggested that the committee should be made to consist of one member from each State represented.

The motion, after favorable remarks by a number of gentlemen, was adopted, and the committee made to consist of the following members:

Messrs. Campbell, of Ohio; Troop, of Indiana; Van Deman, of District of Columbia; McKay, of Mississippi; Leavenworth, of Michigan; Green, of New York; Lindley, of North Carolina;

Hollister, of Missouri; Mesler, of Illinois; and Greiner, of New Jersey.

Mr. Charles A. Green, of New York, presented the following paper:

IS THE VEGETABLE KINGDOM AS SENSELESS AS THE ROCKS?

BY C. A. GREEN, OF NEW YORK.

A prominent writer, in a paper read before the last meeting of the American Pomological Society, referred to "plants and vines as live beings."

It is remarkable that such a statement should be made, and no less remarkable that it should be received, published, and often republished, without comment. If I should rise before a convention of stock breeders and gravely tell them that horses and cattle are live beings, the eccentricity of the remark would be apparent. This urges me toward the conclusion that we are not forcibly impressed with the wonderful endowments of the vegetable kingdom. We have so long seen vines and trees standing in the same position, and filling their offices so mechanically, as it may appear to the casual observer, we almost forget that they *are live beings.* But I have long suspected that vines and trees are not only live beings, but that they enjoy agreeable sensations, suffer pain, and may be endowed with instinct.

If they are not endowed with sensibility and instinct, how can we account for the manifestations they exhibit that so frequently puzzle the thoughtful horticulturist? Can we imagine it possible for vines and trees to begin life from insignificant germs, and develop into beings of grace and beauty, possessing individuality, sexuality, choice of country and place of habitation, and yet be insensible? Can we imagine a tree struck by lightning and burst, root, body and branches, into a thousand fragments, or overtaken by fire and burned to a crisp, without suffering the slightest particle of discomfort? The sexual phenomena of plants alone must lead us to suspect sensibility. How similar is the impregnation of plants to that of fishes, and how similar are the methods of improving breeds of animals and plants! Crosses have recently been made between wheat and rye, and between the raspberry and blackberry; thus we are likely to have the mule and mulatto in pomology. Prof. T. V. Munson, of Texas, denies that insects hybridize grapes, but inclines to the opinion that pollen grains, especially of the grape, are drawn by some sort of instinct or attraction to the stigmas of different flowers or plants than their own. Can we imagine a vine or tree wreathed in sexual blossoms, bathed with spring showers and sunshine, yet senseless as the rock? No; such suppositions do not harmonize with God's creative power and wisdom.

Scientists acknowledge that low forms of the animal kingdom have sensibility and instinct, but they deny such attributes to the vegetable kingdom.

Thus, they hold that the smallest and most stupid worm has sensibility, while the vine or oak has none. When they get down to bacteria, which they can not positively classify as animal or vegetable, how shall they decide whether they possess instinct? The tendrils of a grape-vine will stretch out in the direction of a support much as a drowning man will reach for an oar or a rope. If several canes of the grape are growing in the same direction, the tendrils of one cane will reach desperately and cling to other canes and leaves, or any support that they can reach, but not to the canes upon which they grow, nor upon the leaves of their own canes. The roots of a grape-vine will aim as directly for a well, manure heap or buried bones as a hungry dog for his dinner. A tree planted upon the hill-top will fortify its roots, trunk and branches so as to withstand the blast, while the tree in the midst of the forest is ready to fall, or become dismembered, with the first gale after its companions have fallen by the ax. There are plants that appear to distinguish insects that they hold in their embrace from undesirable objects, holding fast to one but rejecting the other.

How shall we explain the tendency of a vine toward a support against prevailing winds; the rejection of its own cane and leaves by the tendrils growing thereon; the falling of the sensitive plant at the touch of the hand; the sturdier and further-reaching roots of the tree on the hill-top, its tough-splitting trunk, its strong limbs with knotty shoulders where they join the trunk; the plant receiving insects but rejecting distasteful objects, if there is no sensibility, no instinct?

"But can sensibility exist without a nervous organization?" I am asked. It seems to me possible that sensibility can thus exist. A man who has spent his life distant from the streams and lakes might ask, "Can an animal exist and enjoy itself when submerged in water?" He knows he can not but we know that fish can. We have no communication with vegetable life. We can simply speculate about it as we can about the condition of the moon or Jupiter; thus it is easy for us to be misled. Suppose a tree to be possessed with mental faculties without understanding our language and without having any means of communication. What ideas would it have of the animal kingdom? It would have as fallacious notions as we now have of the vegetable kingdom. It would be unable to decide whether man had instinct or sensibilities. It would see certain acts and results, but could not draw conclusions therefrom. Supposing the tree thus mentally endowed should attempt to solve the question whether man was possessed with sensibility. It might witness the falling of a rock upon the leg of a man, binding him to the earth. It would hear him shout, but it has heard him shout before; it would see him twist and struggle, but it has seen him twist and struggle before; it would see him die, but it has seen him die before. It has no communication, no means of understanding the man's language or gestures. Its stumbling-block might be this: can any creature possess sensibility without roots, leaves, blossoms and tendrils?

Life is more mysterious and incomprehensible than sensibility or instinct,

but we are familiar with life, and do not marvel that the vegetable kingdom possesses life. That any being can be endowed with life and be unconscious of life or of pain or comfort may be doubted. There is great similarity between the animal and vegetable kingdoms. The vegetable kingdom nourishes and shelters the animal; the animal kingdom nourishes and protects the vegetable. Both are born, both die, both migrate similarly. There are the male and female in both; both become exhausted without rest; both must have light and warmth, water to drink and air to breathe. In creating the vegetable kingdom what reason can be assigned why the Almighty should not endow it with sensibility and instinct? Considering the marvelous instinct of animals, even of low order, is it reasonable to suppose that God taught the vines and trees to struggle successfully through precarious infancy, to buffet the storms for centuries, and finally to die with no more sensibility of having lived than the lifeless rocks?

APPENDIX.

The following, clipped from an exchange, is suggestive: "'In the old definition of the three kingdoms of nature,' says Mr. Edward Clodd, 'we were taught that plants grow and live, while animals grow, live and move. But this no longer holds good, at least in respect of the lower forms. There are locomotive plants and stationary animals. The swarm-cells or zoospores which are expelled from some of the lower plants, as algæ and certain fungi, behave like animals, darting through the water by the aid of hair-like filaments called vibratile cilia, finally settling down and growing into new plants; others, as diatoms and desmids, are locomotive throughout life. Certain marine animals, as sponges and corals, are rooted to the spot where they grow; while there are organisms which appear to be plants at one stage of their growth and animals at another stage.' Other marks of supposed unlikeness have vanished, and that which was once thought special to one is found to be common to both. So to the biologist it appears that 'all, from the lowest to the highest, have their unity and kinship in ancestral life which was neither plant nor animal.'"

Mr. VanDeman, Washington, D. C.—While in Texas, recently, I was shown by Mr. Munson several hybrids between the peach and plum. The Blackburn plum is one of this class, but it is a humbug. Hybrids are also known between the blackberry and raspberry. The seeming intelligence of plants is sometimes wonderfully manifested.

Mr. Miller, of Ohio—Grape vines manifest particular intelligence in sending their roots in the direction of food. If it exists within their reach they will go for it with as great certainty as a dog finds his bone.

Messrs. Campbell and Pierce, of Ohio, were appointed a committee to take charge of the entries for the fruit and floral exhibition to take place in the Old Tabernacle.

It was decided to hold three sessions daily, at 9 A. M., 2 P. M. and 8 P. M., city time.

Secretary Ragan spoke of the advantages enjoyed by those who become members of the Society.

President Earle read a telegram from Hon. N. J. Colman regretting his inability to attend the meeting, as he was detained by the recent death of his mother and the severe illness of his wife. The Society expressed its deep sympathy for the Commissioner in his bereavement and its loss through his absence from the meetings.

On motion the Society adjourned to meet at 9 o'clock to-morrow.

Second Day—Wednesday.

FORENOON SESSION, September 8, 1886.

At 9 o'clock A. M. President Earle called the meeting to order in the Board of Trade rooms, where, owing to the near proximity to the various railroad tracks, so much difficulty had been experienced the day before in hearing, it was, on motion, decided to hold the remainder of the sessions in the Old Tabernacle, to which the Society adjourned.

After the necessary delay in removing from the Board of Trade rooms to the Old Tabernacle the first thing in order came the reading of a paper by the Hon. J. M. Smith, President of the Wisconsin Horticultural Society.

HOW SHALL WE PROTECT OUR CROPS IN TIME OF DROUTH?

BY J. M. SMITH, OF WISCONSIN.

When the Good Father over all placed man upon the earth, he gave him hands to work with; he also gave him brains with reasoning powers to direct his hands, in order that he might improve his natural condition. These facts are in accordance with both natural and divine laws, and no nation or community has ever yet emerged from barbarism except in accordance with.

them. How high a plane of civilization may yet be reached we do not know, but evidently much higher than any nation or community has ever yet reached. We may justly congratulate ourselves over the vast difference between our civilization and that of any barbaric nation. We are justly gratified and pleased at the almost marvelous advances made in horticulture within the last fifty years. We have learned many things in regard to it. Some lessons we have not yet learned, or, if learned at all, they are so poorly practiced that they are of but little use to us at times when most needed. If our lands are poor we have learned that they must be fertilized if we would be successful. If they are cold and wet we have learned that they must be drained if we would reap the full benefit of our labors. But if a severe drouth comes, what then? Do we make any effort to counteract its disastrous effects? I am sorry to say that in most cases we do not. We generally let our hands drop down in utter helplessness. We let our brains remain idle, our powers of observation are unused, and in utter despair we say, unless Providence sends us rain there is no possibility of anything but failure to our crops. Is this course sensible? Is it reasonable? Nay, more, is it even justice to ourselves and to those dependent upon us? I say no, it is not.

Mr. President and gentlemen, if, in the further discussion of this subject, I refer to my own practice quite often, please allow me to do so without thinking me either egotistical or self-conceited, as I can demonstrate what I wish to say by so doing much better than by any other course.

First, the soil is a matter of much importance. I prefer a dark, sandy loam with a light yellow sub-soil. If this is not to be had a loam with any kind of a light sub-soil is much better than a heavy clay. The last-named will, as a rule, grow large crops, but is much more difficult to handle in times of drouth. We will suppose that we have the dark, sandy loam. It is a beautiful soil to work, and can be made very rich. The first thing necessary is to have it thoroughly drained. Please allow me to describe to you my own system of drainage, which is about as perfect as I am able to devise. My garden contains forty acres, and nearly all of it has a slight slope toward the south. It is laid off in beds precisely two and one-half rods in width, running due north and south. The alleys between the beds are two feet wide, and so arranged that they carry off all the surface water. None of it remains either upon the beds or in the alleys between them, even during our heavy rains. Beneath each of these alleys is, or will be when the work is finished, an underdrain of tile varying in size from two to six inches in diameter. These carry off all the surplus water in the soil, and also make it light and porous as well as warm. The land is now in a condition to stand either wet or dry weather, and do either one much better than if not drained. It is generally conceded by our agricultural scientists that the roots of plants that penetrate deep into the earth do so more for water than for food. It is also very well known that but few if any of our crops will do anything like their best with wet feet, or, in other words, with their roots in

a cold, wet soil that is as sticky as a mass of putty, and from which you can readily press water when holding it in your hand.

In such cases the roots keep close to the top of the ground and if this condi tion continues until mid-summer and then we have a drouth, even a short one, you have all of you doubtless noticed how quickly and how severely the crops suffer. This is simply because they have been unable to get a foothold in the soil that would enable them to protect themselves. My observation tells me that unless they are enabled to get their roots well down into the soil early in the season they will not do it at all, or only to a very limited extent. Hence the necessity of thorough drainage as one means of protection. We have now passed through the most severe drouth ever known in Northeastern Wisconsin. Up to the middle of May the land was in fair condition. Between that time and August 21st we had two light showers, one on June 15th and one about the 1st of July. Neither of them wet the ground except for a few inches in depth. What was the result? Upon examining my cabbage beds I find at a depth of from eighteen inches to two feet hundreds of little fine white roots. They are very small and very tender. In the beds of black seed onions the same thing exists, except that roots do not run more than from twelve to eighteen inches in depth, but are of the same character as in the cabbage. They are there for water, without doubt. I have never seen them at that depth or near it except in dry weather.

Here, then, we have one of the absolute necessities of a defense against drouth. The next one is deep plowing and thorough cultivation. As a rule, the land should be plowed at least eight inches in depth, and then only when it is in first rate order for the plow. The manure is another important element in our favor if of the right kind and rightly used. For this purpose I know of nothing equal to wood ashes. If put on at the rate of fifty to one hundred bushels per acre I never knew them to fail of producing the best results, both as a fertilizer and a protection in dry weather. But as but few of us are so situated that we can obtain ashes in large quantities, we must, of course, do our best without them.

Every horticulturist may and ought to have a compost heap. It should be thoroughly worked over and made very fine. Of course this makes it necessary to have it well decomposed. Put it upon the top of the ground after plowing and harrow until it is thoroughly mixed with the soil. Only those who have tried it will believe and fully realize its great value in dry weather. I generally put it on at the rate of from thirty to forty two-horse wagon loads per acre. Now we come to the cultivation of the soil during dry weather. There is an idea among some growers that the land with growing crops upon it should not be disturbed by any cultivation during very dry weather. This, in my opinion, is a great mistake. I am in the habit of giving extra cultivation at such times, and am satisfied that it is one of my best safe guards.

The surface of the ground in my garden to-day for from one to four

inches in depth is as mellow as a bed of ashes, and before the late rain it was apparently as dry as fresh ashes.

This loose, mellow soil acts as a mulch upon the soil beneath, keeping it cool, and as it is very loose and porous the dews penetrate to the cooler soil beneath and thus aid the plants in their struggle for life. Another great advantage is the following: In case of a very light shower such as we sometimes have during a dry season the effect is almost marvelous. I have often been very much surprised at the effect of a little sprinkling that would hardly allay the dust in the street for more than two hours. Every drop of the rain seems to go just where it is most needed. If, upon the other hand, the top of the ground is allowed to become hard and a light, thin crust form upon the top of it, these light rains will either run off at once or remain and be evaporated by both the hot air and the hotter sun that is apt to accompany or follow these little sprinklings.

Here, then, we have four things that are very necessary to us in our contests with drouth: First, the right kind of a soil; second, thorough drainage; third, the right kind of fertilizers, and lastly, the cultivation. What is the result of following up this system? Last June I had not to exceed three and one-half acres of strawberry vines in full bearing. The plants were set early in May, 1885. The land had been manured at the rate of from thirty to forty two-horse wagon loads per acre for six or seven years previous to the date named. They were well cared for and in the spring of this year after the winter covering was taken off, leached ashes were spread upon the beds at the rate of about one hundred bushels per acre. The beds were hoed three times. The last time the pickers followed immediately after the men with the hoes. The top of the ground was very loose and apparently very dry. All hoeing was shallow—not more than one-half or three-fourths of an inch deep upon the average. A portion of the ground that was quite light and sandy was watered some, though the portions that gave us the largest crop was, if I recollect, not watered at all, none of the beds being thoroughly watered. The average price was between 7 and 8 cents per quart; perhaps nearer 8 cents than 7. There were only two light showers from the time the vines came into blossom until we were done picking. During the picking season the weather was the hottest that I have ever known in Green Bay. During one week of the time there was not a day that my thermometers did not go as high as 95°, and one day both of them reached 102° in what we consider a cool, shady place. Yet with the drouth and the fearful hot weather to contend with and the moderate price for the berries, the actual sales, excluding some hundreds of quarts that were used in the family, given away to friends, visitors, etc., reached the sum of $2,215.24, or $633 per acre.

What makes this case still more marked is the fact that I do not believe there was a single bed of strawberries in Northeastern Wisconsin that had been cultivated in a slipshod, haphazard manner and left to luck, chance and Providence to help them out that yielded one-half of even a fair crop.

Please allow me to give an instance of the effect of ashes as a protection against drouth. I believe it was eight years ago that I planted a few acres with early potatoes. Knowing well the value of fine compost manure, not as a fertilizer, but also as a protection in dry weather, my hired men were ordered to manure the ground from the compost heap. This gave out, leaving nearly or quite an acre unmanured. I told the men to go to the ash heap and get sufficient ashes to put on from sixty to seventy-five bushels per acre. Both were put on after plowing and harrowed in. With this one exception the treatment was the same in all respects. The soil was alike. After they got fairly to growing a very severe drouth came on. I watched the growing crop with much interest, expecting to see the portion of it where the ashes were fail first. Much to my surprise the reverse was the case. The dry weather continued and the tops upon all that portion of the piece that had been manured from the compost heap lay down and died, or ripened prematurely. They scarcely paid for digging, while those that had ashes put on the ground kept on growing, and yielded not a large, but still a fair crop. In value for market they were worth more than four times as much as the others. I mention this as one of many marked instances in which ashes have acted as a great protection in times of drouth, as well as an excellent fertilizer.

I have now growing about eighty thousand cabbages that are the surprise and delight of all who visit the garden. Only a few days since a gentleman said to me: "How in the world do you manage to keep them looking so well during this terribly dry weather?" Those of them that have been set out longest have had two light showers, but over thirty thousand of them have had no rain sufficient to allay the dust for more than two hours until August 21st, and but one or two sprinkles of even that kind. The plants were, of course, well watered when they were set out. They were set at different times from the 20th of May to the 20th of July. So fine was their appearance about the 10th of August that one of my sons who visited the garden at that time almost became angry with his brothers and myself because we insisted that they did need rain and would be much the better for it. The land upon which they stand has been heavily manured with fine manure, and in addition to that has, a part of it last year and the balance of it this season, had ashes put upon it at the rate of about one hundred bushels per acre. It has been cultivated just as well as I know how to cultivate. In fact, so complete a protection do we consider the points named and so accustomed have we become to large and fine crops that we consider them almost a certainty, and make our estimates accordingly. Still, when my excellent wife hears me saying that we will grow so much of this, that or the other, she sometimes says to me that "you should say, if the Lord will, you will raise such and such crops."

My reply to this is, the Lord does will that we should have large and abundant crops, and that the cases are rare indeed in which He fails to do His part. It is us fellows here who fail to do ours. It is, indeed, a fact that

there is occasionally a season so unfavorable that, with our present imperfect knowledge of cultivation, our crops will, in spite of all our efforts, be at least partial failures. But such cases, instead of being the rule, are the rare exceptions.

Now, gentlemen, I will not be so foolish as to say that we can, by the course I have indicated, make ourselves independent of the need of rain; but we may do this much: we can carry the growing crops through a moderately dry season with but very little damage. Even the present season, the dryest ever known in the State, the large piece of cabbage spoken of kept in wonderfully fine condition, all things considered, until the rain came, August 21, and now bids fair to give me a very fine crop, while there are tens of thousands of them about me that have not been properly cared for that will yield their owners almost nothing. I might multiply cases by the dozen, but do not deem it necessary.

A few words about irrigation, and I will close. Where one is so situated that he can water his growing crops artificially without incurring too much expense it is a fine thing. Some of you are aware that I have practiced it to some extent for a number of years. My water-works were built when my garden contained only twelve or thirteen acres. It now contains at least forty acres, and as a matter of course the machinery will not raise and distribute water sufficient for even one-half of it. A few things should be remembered by those who contemplate artificial watering. Suppose that you have one acre of cabbage that you wish to water. To do this fairly well requires at least 30,000 gallons of water; and this will need to be repeated at least as often as once a week until rain comes. To make strawberries do their best in dry weather requires considerably more than for cabbage, and to be put on oftener. To merely sprinkle the ground when it is very dry is, in my opinion, a damage rather than a benefit, for the following reason: It has a tendency to form a thin, hard crust, both air- and water-tight. Neither the damp air nor the dews will pass through it; neither will a light shower. It requires a heavy rain to dissolve it. Thus, you shut out the benefits to be derived from the cool, damp night air, the heavy dews that we often have, also the little sprinkles of rain that are almost sure to come occasionally, and in the place of it get practically nothing. Gentlemen, I am not guessing in this matter, but speak from practical experience. For a couple of years after my water-works were put up I was at a loss to understand why it was that our watering had so little effect. I had a piece of early cabbage that was suffering for want of rain. The men were told to put on water until the ground was thoroughly soaked for at least six inches deep. They did so, and I learned two things by it. One was that a thorough watering would make the plants grow; the other was that it took a great deal of water to make it thorough.

Hence, if you water at all, do it well. No system of artificial watering that I have ever tried is equal to rain from the clouds. I do not state these things to discourage any one, but because I believe them to be facts that

should be known to those who contemplate some improvements of this kind. My water-works cost me nearly $1,000, and I have no doubt but that they have more than once paid for themselves in a single season. I intend to enlarge them before another growing season overtakes me.

Gentlemen, I have already occupied more time than I intended, and will bring these remarks to a speedy close. The importance of the subject is my only excuse for taking so much time. I have long been satisfied that very many of our horticultural friends fail to realize what they might and should do for their ground, in dry seasons, simply because they do not take the full advantage of all the aids that are lying idle about them to aid the plants to at least keep themselves in good condition to receive the full benefits of the rain when it does come, even if they can not keep them growing through the dry weather. If in what I have said some few shall be induced to follow a better way in this respect, and one that I am well assured they will find more pleasant and agreeable as well as more profitable, I shall be content with my labor, and consider that it has not been performed for naught.

DISCUSSION ON MR. SMITH'S PAPER.

Mr. Ohmer, of Ohio—I wish to emphasize the importance of constant culture in time of drouth. I do not mean to let your land lay until the drouth is fully on, and then go in and tear up the surface in great clods and lumps, but to keep the cultivator going from the beginning and keep the surface loose and mellow. There is no danger from drouth if you will practice this method of constant culture. Some years ago I sold from four acres of ground, five hundred and sixty-two bushels of Kittatinny blackberries, and it was one of the dryest seasons on record. My land was well fertilized, and I kept the cultivator going constantly during the drouth. I believe in tile draining, deep culture in the preparation for crops, the liberal use of fertilizers and frequent surface culture, especially during periods of drouth. In this way we can almost defy drouth.

Dr. McKay, of Mississippi—President Smith, how deep do you lay your tile, and did you raise as good crops before tiling as since?

Mr. Smith, of Wisconsin—I commenced to practice tile draining twenty-five years ago. I lay my tile about three feet deep and two rods and a half apart. I place the tile in the alley-ways between my beds of plants, or midway between the rows of trees, if it is in orchard. The roots will not enter and fill up your tile so badly if

placed as far as possible from the trees. I would use nothing smaller than two-inch tiles. I have always fertilized and cultivated well. If I were compelled to leave off one of these operations—tiling, good culture, or liberal fertilizing of the soil, I am at a loss to know which it would be. Indeed they are inseparable, and good results can not be obtained without each. The summer culture of strawberries should be done with the hoe, never going deep enough to disturb the roots. My tiling costs me about $15 per acre, but the price will vary somewhat with the character of the soil and size of tile used.

Mr. Boggs, of North Carolina—The product of the celebrated Sea Island Cotton of South Carolina has been greatly increased, both in quality and quantity, since the planters have began to tile drain their land.

Prof. Lazenby, of Ohio—Mr. Smith, are your strawberries not injured by dirt, where you practice summer culture to offset the effects of drouth? Would it not be better to mulch with straw, rather than your loose, mellow surface, which I grant is a good means of counteracting the effects of drouth, on the account of its being more cleanly?

Mr. Smith—My objection to straw as a mulch, is that it is apt to befoul our soil with weed seeds. We do not hoe immediately under the fruit as the ripening season approaches, and so are not much bothered with dirt.

Mr. Green, of New York—There is no better mulch to arrest the waste of moisture from the soil than a well tilled and well pulverized surface of mellow earth. The roots of fruit trees will not fill up drain tiles like those of willows and elms. A willow tree will send its roots a long ways and find your tile, which they will soon fill up. Wood ashes has not proved of much value as a fertilizer, in my experience. I think its value depends largely upon the character of the soil.

Mr. Harrison, of Ohio—I tile drained about seventy acres of land last spring, using two and a half and three inch tile, the ditches two rods apart, and laid two and a half and three feet deep. With the best implements and skilled labor, it cost me $45 per acre to do the work.

Prof. Claypole, of Ohio—The carbonate of potash in wood ashes absorbs moisture from the atmosphere. This makes it valuable in time of drouth.

Mr. Smith—Double the quantity of leached ashes should be used. Used in this proportion, they are about equal to unleached ashes.

Mr. Crawford, of Ohio—The difference in cost of tile drainage, as reported by Mr. Smith and Mr. Harrison, may be explained by the difference in the character of the soil. Ditches are much easier made in some soils than in others. The size of tile used and the depth at which it is laid also affect the price materially.

Mr. Smith—Why use three-inch tile? Small sizes are much cheaper and just as good.

Mr. Albaugh, of Ohio—I do not agree that small tile is as good as large. It will certainly fill up much sooner. I would use none less than three inches.

Mr. Ford, of Ohio—In my judgment small tile is best. In a flush time the current runs in a narrower channel in the small tile and will carry out the sediment better. I lay my tile four feet deep and they not only drain a much wider area, but are much less liable to fill up than when laid nearer the surface. Ashes are beneficial in time of a drouth.

Mr. Harrison—We began with one inch tile and have increased to three and four. The idea of flushing small tile is all theory. They will fill up sooner than large tile.

Mr. Caywood, of New York—Mr. Ford is undoubtedly right. Small tile, if properly laid is best.

Mr. Cook, of Michigan—I think that when water is confined to a narrow channel, as in the small tile, it must keep clear of sediment.

Mr. Wheeler, of Ohio—I have laid tile from one and a half feet to six feet in depth, and used sizes ranging from one and a half inches to four inches in caliber. I would use no more of the smaller size, though two-inch tiles have given good satisfaction. I have taken up some two-inch tile which had been laid eighteen years and found it all right.

Prof. McKay, of Mississippi—The good results of tile drainage are not all manifest in wet weather. It is equally beneficial in time

of drouth. Following our unusual wet weather of this last summer was an extreme drouth, coming on suddenly, and as soon as the season of floods ended. Lands that were undrained made almost nothing, while those that were drained made good crops.

Dr. Townshend, of the Ohio University—I have tile on my farm in Lorain County which was laid in 1831. Since then I have laid many miles of tile, using various sizes. I would prefer small tile, just large enough to carry the water to larger ones. In large tile the water spreads out over more surface, and is more apt to deposit silt. When water contains iron, however, small tile should not be used, as the deposits adhere to and will sooner fill up a small than a large tile. For all lateral lines I prefer two-inch tile; for the mains larger sizes, in proportion to the number and length of laterals. I have little trouble from roots of ordinary orchard trees, but willows should never be planted near a ditch. Peach trees are much worse than apple trees to fill up the tiles. Some years ago I planted an orchard on undrained land. It did but little good until I had it tiled; since which it has done well.

President Earle, of Illinois. I want to thank Dr. Townshend for his valuable remarks on the subject of tile drainage, and, also, to thank Mr. Smith for his eminently practicable and valuable paper. Mr. Smith does not deal in theories, but tells us, in his own practical way how he produces his good crops of fruits and vegetables in good seasons as well as bad. And now, ladies and gentlemen, we have indulged in a long discussion of this important paper and the topics which it has presented, but as we have other important subjects and papers ahead of us, I would suggest that we now hear from a gentleman from the far-off and ancient Empire of Japan, whom our Secretary has been fortunate enough to have present with us, with a paper on vegetables in Japan. Before introducing Mr. Tamari I must tell you who he is. He is the gentleman whom his government sent to the great World's Exposition at New Orleans in charge of the Japanese exhibit. Since the close of the Exposition he has been traveling in our country and studying our systems of agriculture and horticulture. Mr. Tamari will now read his paper in your hearing.

VEGETABLES IN JAPAN.

BY KIZO TAMARI, OF JAPAN.

You will be surprised when I tell you that a single root of burdock sometimes sells for twenty-five cents in Japan. From this you would suppose that we have no good vegetables in our country. Our people are equally surprised to learn that a quart of blackberries often sells for a like sum here, and that they are here considered a delicious fruit. Taste is greatly the result of education.

There are many culinary vegetables of good quality in Japan. Here you have an abundance of delicious fruits. The existence of different ideas in two countries as to the choice of edible plants depends not only on the taste, but also on the habits of living, methods of cooking, etc. The appetite differs more or less in individuals of the same family. So it is with people of different nations. The climate, social conditions, etc., may have much to do with this. Some vegetables which we are fond of may be regarded as undesirable for your cookery. It may, however, be interesting to enumerate a few of our vegetables which are not much grown or which are quite new in this country, and to describe some of the different habits of plants in the different countries. We will place them in four or five groups, according to the purposes for which they are grown, so that you will readily understand the uses and nature of the different plants.

First are those grown for the root. There is no vegetable in Japan so extensively used, and which varies so much, as radishes. The roots are not small or round, nor red in color. They are mostly cylindrical, fusiform or club-shaped. They are from one-fourth of an inch to more than a foot in diameter, and are from six inches to more than a yard long. With so many varieties, we have them the year round. The spring varieties are small and solid; the autumn varieties are large and tender. Sakurashima, which grows in the southern island, is the largest one, and sweet. It is globular in form, growing through the winter, and increasing in size in the spring.

Our carrots are small, but longer than those grown in this country. They are from an inch to an inch and a half in diameter at the crown, and from two to two and a half feet in length. They are of high colors—yellow and orange.

Burdock comes third in general estimation as a Japanese culinary vegetable. The root is often grown to a foot in circumference and three feet in length. It will take a year to get such roots, but they are soft and delicious. The plants above mentioned require deep cultivation, and would not suit this country.

Among turnips there is a small, fine variety, of white color, which is used as radishes are in this country. Some are bright scarlet colors. In shape they are globular or oblong, and do not grow so large as radishes.

Taroes (*Calocassia*), of the Arum family, are very extensively grown, and

are used as potatoes are with you. *Alocassia*, or *Caladium*, which is grown as an ornamental foliage plant in America, belongs to the same family, and possibly may be the same species. It is very profitable to grow in shady places, as in orchards. It is grown everywhere in the South and in the North, and but few insects are known to trouble it.* It is, also, very free from disease of any kind. The annual production may be estimated at six or seven million bushels. They taste like potatoes, but are more mealy. The rough skin is an objection to them. A kind of taro (*Leucocassia gigantea* Schott.) which is met with in the Southern States we cultivate for the stalk, which is used as a salad.

Konjak (*Conaphollus konjak*) is grown in shady, moist ground. It is boiled and mashed up and made into gelatinous cakes, in which shape it enters into our kitchens. Common and sweet potatoes need no special notice. The former is grown comparatively little in the northern part, and the latter is extensively grown in the South, where farmers live almost entirely on this tuber, as the Irish do on the common potato in Ireland. A variety called Forty Days may be noticed on account of its earliness.

The Japanese yam (*Dioscorea Japonica*) is used quite extensively. The roots of wild plants are best in quality. The roots will grow two inches in diameter and three or four feet long the first year. Digging them is hard, laborious work. A variety called Fist grows nearer the surface.

A variety of lily (*lilium tigrinum*) is grown in the corners of fields where the plowshare can not go, and thus the ground is economized. We get the bulbs two or three inches in diameter, in two or three years.

Our onions are not grown for the bulbs, but for the green, tender stalks, which are used like celery.

Peas and beans are so numerous in varieties that they can not be easily described. Besides common cultivated peas and beans, we have asparagus beans with long and tender pods, ensiform beans, many kinds of kidney beans and soy beans (*soya hispida*), etc. Some are used green, in pod, and the seeds are mostly used for making different kinds of cakes or as parched beans. The most important crop among our pulse is the soy bean. The annual product is about the same as that of wheat, viz.: eleven and one-half million bushels. This large amount is consumed in three different forms in our culinary uses, viz.: miso, shioyu and tofu. The first and second are made of the beans, wheat or barley, common salt and water; the first in the form of paste, and the second a liquid, commonly called Japanese sauce. The third is a white mass, made by coagulating extract juice of the bean with a solution of epsom salts. This is called Chinese cheese by the English.

Tofu is very extensively and commonly used, especially among those living apart from the seacoast, and where they can not get fresh fish, this is cooked and used as a substitute for fish. This bean is exceedingly rich in

---

* Since writing this, I now recollect that the broad leaves are sometimes eaten by a large green larva. K. T.

nitrogenous substances. It conains about thirty-seven per cent. of albuminoids, or over three times as much as wheat, barley, or oats, and one and a half times as much as peas or beans. So far, our people are the most extensive consumers of pulse of any people in the world. It seems to me that it is caused by the demand for nitrogenous food, which was almost excluded from animal food besides fishes on our table.

Egg plants are mostly oblong and large. Recently two Chinese varieties were introduced; one is very long and another very large and round. The former is about one inch by one foot and a half; the latter is over six inches in diameter. They are not popular.

Among the gourd family, our squashes are small, but solid and very sweet. They are flattened, deeply grooved, and of reddish color. A small oblong variety of golden muskmelon is common and popular. It is rich in flavor and taste.

Cucumbers are grown only for use in early spring, and afterwards varieties of *cucumis common* take their place. They are hardy and profitable. The gourd was formerly one of our novelties for receiving any liquid. Different forms of gourds are more or less artificially designed.

In the southern islands a large variety of *lagenaria duristemon* is grown sometimes two feet by three feet, of green skin and white powdered. The flesh is soft. In some parts varieties of luffa (*L. petola*) are used when young. Lately a large variety was introduced, being about eight to nine feet. When ripened, the inside network is used as a sponge.

Balsam apples (*momordica charantia*) are grown. They are commonly fusiform, but in the southern part there is a larger variety, white instead of green, which is not so bitter as the small green variety.

For leaves and flowers: we have no varieties of cabbages. What is here called Japanese cabbage is a variety of *brassica chinensis*, and is of Chinese origin. Varieties of this species are innumerable, and the leaves are unfolded, except the one above referred to. So it is with our spinaches. A kind of chrysanthemum (*ch. coronarium*) is cultivated for its leaves and stalks. It is tender, and of fine flavor and used as spinaches. In this country this plant is grown for its flowers, which are both single and double. The stalk still seems to be tender. The flowers of the common chrysanthemum, generally of yellow color, are used in Japan. Before the flower fades away, the petals are collected and put in an iron pan on the fire and stirred till it boils, and afterward carefully dried in the sun, and kept in an air-tight porcelain pot. It thus keeps in good flavor and color for several years. To use this, it should be put in boiling water for a few minutes and then into cold water. Young flowers of *amomon mioga* and *petorites Japonica* are used for relishes in season.

For its young shoots and stalks: *aralia cordata* is grown as *asparagus cryptotænia canadensis* is cultivated like celery, and used to cook. Two kinds of fern (*Pteris aquilina* and *asmunda regalis*) are used. These ferns, bamboo shoots, and some others, are rather wild grown, but some are forced in hot-

beds or carefully manured. A bamboo bush near a large town adds a large amount of income to the owner. Six or seven kinds are commonly known as edible. Among aquatic plants, the most common vegetable is lotus (*nelumbium necifera*) or African water lily. The leaves and flowers are very large. They grow in marshy land or in ponds. The roots are over four feet long, having 5–6 internodes and 7–8 holes vertically inside. They are mealy and wholesome. A Chinese variety, lately introduced, is very large, being about three inches in diameter, but the internode is shorter than the original variety. A variety of arrow-head (*sajitaria sajitifolia*) is grown in marshy land. The tuber has a good flavor, but is a little bitter in taste. Tuber of water chestnut (*scirpus tuberosus*) is smaller than that of the above. This is used in a raw state. The young shoots of *brosenia per tata*, which grows in an old pond, is covered with a transparent gelatinous substance. This is used as a delicacy. Different species of sea weeds (seven species common) are used. The highly esteemed species is *porphyra vulgaris*. This is made into shape like thin sheets of paper, for the sake of convenience. Culture of this weed and making into the sheet is one of our important industries.

There is one more group remaining to be spoken of. This comprises those which are used for flavoring or relishes, as horse-radish, water-cress, etc. Wasabi (*entrema wasabi*) is the best representative for fragrant, sweet, acrid taste. It is used just like horse-radish, but is more noble. The best roots are cultivated only in clear spring water running down the mountain valleys. Young leaves of *polygonum japonicum* are used like water-cress. The leaves and spikes of fragrant basil (*perilla arguta*) are used in different ways so as to impart fine fragrance and a deep purple color. A variety of deep purple and curled leaves may be fitted to ornamental foliage plants like coleus in this country.

The President appointed the following committees of awards on the horticultural exhibition:

On Apples—Messrs. H. E. VanDeman, of District of Columbia; N. W. Cook, of Michigan; J. V. Lindley, of North Carolina.

On Grapes—Messrs. G. W. Campbell, of Ohio; T. S. Hubbard, of New York, and T. Greiner, of New Jersey.

On Pears, Peaches and Plums—Messrs. N. Ohmer, of Ohio; P. C. Reynolds, of New York, and A. B. McKay, of Mississippi.

On Plants and Flowers—Messrs. J. J. Harrison, of Ohio; Prof. Troop, of Indiana, and Prof. Lazenby, of Ohio.

On motion of Mr. Van Deman, of D. C., the invitation to visit the vineyards of Euclid was accepted and the time fixed for Friday, the 10th, after which the Society adjourned to meet at 2 P. M.

Second Day—Wednesday.

AFTERNOON SESSION.

THE HORTICULTURAL EXHIBITION.

Through the liberality and energy of A. C. Kendel and a few other citizens of Cleveland and Northern Ohio, aided by the Ohio State Horticultural Society, provision had been made for a horticultural exhibit in connection with the meeting of the Society. This exhibition was made in the Old Tabernacle, where the sessions of the Society were now held. The hall had been very handsomely decorated and the exhibit, which was now in its full glory, was indeed a grand affair. A city paper had the following description:

The exhibition in connection with the Horticultural Society convention opened yesterday noon, and attracted hundreds of visitors during the day. The plants, flowers and fruits placed on long tables in the Old Tabernacle took away much of the gloom of the large hall and transformed it into a beautiful retreat. Messrs. Kendel and Roberts, who arranged the exhibit, did themselves proud. Strings of evergreen were festooned along the walls and balconies, and the large stage was transformed into a conservatory filled with hot-house plants. Nearly two hundred exhibits were received at noon, and during the afternoon many more were placed in the hall. Upon the stage Edwin Geering, the gardener for Mr. J. H. Wade, had filled the center with fifty varieties of plants that had been gathered from all corners of the earth, many of them being very rare. David Charlesworth, the Sibley street florist, also exhibited fifty plants and choice ferns of the finest kind in competition with Mr. Wade's contribution. In floral designs there were two entries. Mrs. Ella Grant Campbell, of the Jennings avenue greenhouses, showed a dainty white parasol of carnations with a lining of bright scarlet Lady Emmas. The exterior was decorated with a drapery of LeFrance roses and auratem and candidum lilies softened by a spray of delicate ferns. The whole was supported by a stand of tropical ferns. The other entry was supported by a stand of tropical ferns. The other entry was by J. M. Gasser, of No. 71 Euclid avenue, who exhibited a large fish made of vincas, lying upon a huge platter made of white carnations. The green fish and white platter were relieved by a spray of choice roses, the whole being a work of art. Mrs. Campbell had a fine exhibit in the department of cut flowers, showing a lot of pansies, rare varieties of the annual phlox, and one hundred other choice plants and flowers. Peter Harkey, of Holmden avenue, had an exhibition of all classes of astors and geraniums. Edwin Geering had a collection of thirty-three varieties of geraniums. Thorpe, the

New York florist, had a collection of about seventy-five varieties of gladiolas, which were in competition with gladiolas entered by Mr. Sked, of this city.

THE FRUIT EXHIBIT

Is said to be the finest ever seen in this city. Choice apples, peaches, pears, grapes and plums from all parts of the country are on the tables, and attract marked attention. Mr. O. Miller, of Unionville, O., shows some fine Concord grapes and other fruits. Mr. H. Cushman, of Euclid, has fifty varieties of grapes, making a splendid exhibit. Mr. Cushman has a vine of the new Worden grape that met with much praise, being heavily laden with branches of the luscious fruit. Mr. T. S. Hubbard, of Fredonia, N. Y., exhibits a new seedling of his development, showing twenty-five large bunches of white grapes upon three feet of wood. On the same table is a fine collection of plums, pears, and a plate of juicy Cumberland Triumph strawberries just ripening. Thirty varieties of plums of every color and size presented an inviting appearance, as did seventy-five varieties of apples sent to the show by the Horticultural Society of Allen county, Kan. Quinces, plums, grapes, prunes, and every species of fruit grown in the United States, were upon the plates that stood side by side upon the long tables. Prizes in every department will be awarded by the committees appointed at the morning session of the convention yesterday. The exhibition will last to-day and to-morrow, the public being invited to attend and examine the fruits that illustrate the remarkable development of horticulture during the past few years.

On resuming the chair at 2 P. M. President Earle introduced the afternoon session by presenting Mr. Greiner, of New Jersey, who read his paper on Transplanting.

TRANSPLANTING IN THEORY AND PRACTICE.

BY TUISCO GREINER, OF NEW JERSEY.

The results of several series of experiments conducted on the *Orchard and Garden* experiment grounds during the month of August last tend to show that the subject of transplanting, simple as it may appear to you, and the principles underlying this operation, are not any too well understood by even the professional gardener. The importance of the matter has led me to put it before this intelligent assembly, in the hope that still additional facts may be brought to light.

This season's experiments in transplanting, restricted to cabbage and celery plants and their behavior during dry weather and under a clear sky, were wholly practical. Microscopic examinations for the sake of observing the mutilation and gradual re-formation of the fibrous rootlets were not resorted to. At the beginning of these experiments I had on hand the usual supply of finely spun theories, of which the following was a leading one: A

plant when pulled up from the seed bed suffers more or less mutilation of its feeding apparatus, hence is not in condition to be exposed at once to the hardships of outdoor life. As a sick person is put to bed and protected from fatigue and from the heat of the sun, etc., so should the freshly pulled up plant be placed in a dark, cool, moist cellar, with its roots covered by moist soil, until reaction takes place, and the rootlets send out new feeders to take hold of the soil at once when replaced into it. Practical test has demolished this as well as a number of other theories.

For the sake of brevity, I will content myself with the enumeration of the results of all these experiments, without describing the latter in their details. It should go without saying that the operation itself, in every case, was performed in the only correct and proper way, *i. e.*, the soil was firmly pressed about the roots of each plant; and any one who wants to be guided by the rules laid down in this essay must be careful to do the work in the same manner. The following truths I have ascertained to at least my own satisfaction, viz.:

1. Celery and cabbage plants become established in their new quarters as well and as quickly whether freshly taken from the seed bed or after being kept in a damp cellar for any number of days between one and six, with a hardly noticeable difference only in *favor of the freshly pulled plants.*

2. There is no perceptible difference in the behavior of plants after transplanting whether during their short interim in the cellar their roots were kept in damp soil or in water. The new formation of fibrous rootlets, one-quarter inch in length, developed during a several days' sojourn in water proved to be of no advantage whatever.

3. Plants set out just as they come from the seed bed or cellar do exactly as well as those the roots of which were dipped in water or mud before transplanting. The *famous "puddling" is of no account.*

4. The application of water to a reasonably moist soil—one which is neither wet nor dry, and therefore in the only proper condition for the work—after transplanting has *no visible effect and is entirely superfluous.*

5. When the soil is very dry the application of water some time before setting out the plants, so as to get a merely moist soil at planting time, is of decided advantage, and *preferable to watering after planting.*

6. Under average conditions I find it entirely immaterial whether the work is done in the forenoon or afternoon, whether before or after the almost proverbial "4 P. M." Only during extremely hot weather, with an excessively dry atmosphere, would it be advisable to defer setting out plants, when the planter is ready for the work in the morning, until "after 4 P. M.," in the hope of gaining an advantage thereby.

7. Plants pulled from the seed bed when this is thoroughly wet recover from the effects of transplanting sooner than when taken from a scarcely moist bed.

8. Shading the plants for a few days after setting them out, either by means of boards above the rows or by other means, is of decided and lasting benefit.

The here enumerated facts undoubtedly justify us in accepting the axiom that the plant itself—its character, size and condition—is a much more potent factor in deciding the outcome of this work—whether it be failure or success, and in what degree—than the method of managing it which a careful gardener might choose. Many of the different precautions and little devices employed by members of the craft, and frequently advised by the horticultural press, are, after all, only the result of imagination rather than observation.

I was at first quite favorably impressed with the method and advice of friend Goff, of the New York Experiment Station, to stand cabbage plants upon a layer of moist soil in a shallow box, this to be kept in a damp cellar for twenty four hours prior to replanting, in the expectancy of that "reaction." My experiments flatly contradict Mr Goff's story. Still, when plants have become badly wilted, either in transit or by exposure otherwise, they ought not to be planted without first giving them a chance to partially recover from the effects of this ill-treatment, and friend Goff's plan in such case is as good a one as I could name.

How can you invariably succeed in making plants live and thrive? "*First catch your plants.*" Do not catch them in a patch of weeds where they are trying to hide their deficiencies. Do not catch them in a crowd; long-legged, weak-kneed, dudish-looking things, without bone or marrow, composed mainly of water and gas, and ready to wilt down before the first breath of fresh air and before the first ray of sunlight. Catch stout, stocky, hearty, well developed plants. As to their size, let me say that celery plants should be large—in fact, the larger the better—as the roots develop but slowly during their early life. Cabbage plants of medium size seem to get over the effects of transplanting quicker than very large or very small ones. Their roots develop comparatively much earlier than those of celery. In both kinds of plants, however, the proper balance between root and top must be either already existing or established by pruning. In a prolonged wet spell plants which are mostly top and have very little root often succeed quite well—like cuttings put in the propagating bed. In dry weather good roots are the essential part, and the tops should not be larger than of corresponding size, or, if they are, have the excess of top twisted off.

The character—or, rather, composition—of the plants is of the utmost importance. Any plant, no matter how thrifty and vigorous it may appear to be, is of little value if its mineral constituents are scanty. The right kinds of plants, such as will bear handling and transplanting nicely and quickly recover from its effects, are those grown on soil abounding with the mineral elements of plant food, not on one with an excess of vegetable matter. To the grower who desires to produce plants which even a less skilled hand can transplant safely and successfully I can give no better advice than the following:

Plant the seeds on a porous loam enriched by a liberal amount of bone dust and ashes, or of some good complete fertilizer. Well decomposed stable

manure may be of benefit by getting the ground in the right mechanical condition, but must not be applied in excessive quantities. A freshly turned young clover sod, without stable manure, is perhaps as good a selection as can be made. The minerals, however, should be added to the soil in every case. Do not have the plants crowded, and give clean cultivation.

After the reading of Mr. Greiner's paper, President Earle read the following:

NUT CULTURE AT THE NORTH FOR PLEASURE AND PROFIT.

BY J. T. LOVETT, OF NEW JERSEY.

["Gather nuts and plant them. Plant by the wayside and in all open places. So shall you help to make every road a path of delight and the waste places to blossom and bring forth fruit until the land will be like unto paradise—the garden of the bless'd. If all persons would only do this, in a few years want in country districts would be almost unknown, for abundance would spring from the earth."—*Anon.*]

NUT CULTURE FOR PLEASURE.

Connected with the very thought of "going nutting" is an indescribable charm, a fascination which takes hold of the boy irresistibly so soon as his little legs get strong enough to carry him to the nut grove, and which does hardly weaken its grasp through life. The man in the full strength and vigor of life can not shake it off. It clings to him until, bent with old age, paralyzed and gouty, he drags himself with tottering steps to the old familiar chestnut tree to pick up, now wearily and with considerable effort, the tempting brown fruit, as he has done year after year through life. In short, this charm exerts its influence over all, young or old. The mere expression "going nutting" makes us older ones feel young again, and kindles a joyous light in the countenances of the young through the anticipations of pleasure.

Any one reared in a wooded district will find it difficult to erase from his memory these indescribable pleasures and charms of the nut harvest. But a feeling of intense sadness overcomes us when we see the indigenous chestnuts, hickories, pecans and walnuts of our forests, one by one, fall under the merciless stroke of the axe. At the north, at least, with its rapidly increasing population and relentless timber devastation, we are in danger of losing one of the purest of all natural pleasures, one of the greatest charms of farm life, one of the strongest ties which bind the boy to the old homestead and keep him in the ever-enobling and refining contact with nature—unless we come to a realization of our duty to plant nut trees. While we have an abundance of suitable and cheap land, there is every reason that we should do so. Can any one in this intelligent body tell me a *single reason* why we should not? Can you name a single obstacle in the way? True, it has been claimed that nut trees are difficult to transplant, but this is an *error*. My

experience, at least, goes to show, without an exception, that they transplant more readily, if nursery grown, than the cherry, and quite as readily as the pear. Nut trees are also modest in their demands as to soil and cultivation, doing fairly well in a cheap grade of the former and with little or none of the latter. The planting of nut groves will be amply, abundantly repaid alone by the pleasures they yield to ourselves and to our children. In fact, we can hardly buy harmless enjoyments cheaper than in this way. I appeal to every farmer who is a father or grandfather. For your children's or children's children's sake, plant nut trees. For the love of home, for the love of our country, for the good of society and the world at large, plant nut trees. The greater a variety you will plant, the more varied will be the pleasures and profits which you thereby provide for yourself and family.

The only objection, the only consideration which might keep people from planting nut groves, viz.: that it takes a long time for the trees to come into bearing, can hardly be of much weight, and is easily met with the allusion to the planting of apple or plum orchards, which also take some time, *and surely not less*, to come into bearing. A person with ten or fifteen years of life yet before him has a fair chance to enjoy the fruits of nut trees which he plants now, for five or ten years. Japan chestnuts, almonds, filberts, dwarf English walnuts begin to bear as young as a peach tree. Is not the opportunity to watch their growth, and see the formation of the first burs and taste of the first fruit pleasure enough? Plant some of these early bearers for yourself—a grove of standard chestnuts, pecans, hickories and walnuts of all kinds for your boys.

NUT CULTURE FOR PROFIT.

Trees which yield such pleasures and a full home supply of fruits must be considered profitable. There are those present who perhaps wish to hear something about the commercial aspect of nut culture. I confess that this is yet the "hardest nut to crack," as so little has been done in this respect to furnish me data on which to base calculations. The industry is as yet too young to speak solely from facts. Thus I find myself compelled to step over just a trifle on the field of speculation.

Hear-say, not personal observation, is my authority for the statement that the almond is extensively and profitably cultivated in California, and that the English walnut there begins to be recognized as a money crop, hundreds of acres having been planted with it quite recently. At the North, however, we have to confine our operations to strictly hardy fruits, and the almond, not being reliable enough in this respect, must be left out of consideration. The English walnut succeeds in many of the Northern States. The venerable Patrick Barry, at a recent horticultural meeting, mentioned the remarkably heavy and regular yield of the English walnut trees in the gardens of the German gardeners in the suburbs of Rochester, N. Y. I have seen large trees in bearing in New Jersey and Pennsylvania. Considering the relative size of trees and amount of fruit, as also the price which the

grower can readily obtain for his crop, and the fact that the latter, not being perishable, can be marketed safely and at leisure—in short, all the great advantages which nut culture has over that of almost all other fruits, I fail to see a single reason why the English walnut should not prove to be a highly remunerative crop in any place where the tree thrives. I have much faith in its feasibility.

Filbert culture has been attempted on quite an extensive scale in several places to my certain knowledge, and with highly satisfactory results in some instances. Especially has the Kentish Cob filbert proved profitable. Still I must advise caution with this fruit on account of its liability, especially in a warm and dry climate, to be attacked by a fungus upon the bearing wood, which always proves fatal.

Among nut trees, which may be cultivated both for their fruit and timber, may be named principally the Black Walnut, the Pecan and the Chestnut. It is not necessary that I should dwell on the timber value of these trees. The press in recent years has cited hundreds of instances where large fortunes have been made in the West from a small acreage of Black Walnut trees.

Pecan culture can not help but be profitable at the price this fruit brings in market at present, and the owners of regular chestnut orchards are well aware that the latter are more profitable than apple orchards, especially those of the Spanish chestnut. At all events such has been the experience of William Parry and Joel Horner, of New Jersey; Samuel C. Moon, of Pennsylvania, and others with whom I have conversed.

Of all the nut trees, native or foreign, we have at the present time none of greater promise than the Japanese chestnut. While I am unable to present the "figures, which do not lie," I would invite all who are inclined to doubt the statement to come to the Monmouth Nursery and see with their own eyes the four-year-old trees covered with well filled burs, and admire the astonishing size of the nuts. Nut growing has a great future, gentlemen; and you may be sure that the early nut planter will catch the profits.

DISCUSSION ON NUT CULTURE.

President Earle, of Illinois—There is no doubt but that we have greatly neglected the subject of nut culture. This is a subject of considerable importance, and I hope you will discuss it freely. The pecan is a valuable crop in the South, but the trees are rapidly being destroyed. Indeed, this is the fate of most all our native nut-bearing trees.

Mr. Smith, of Wisconsin—How far north may the pecan be relied upon as hardy?

Mr. Miller, of Ohio—It is native to the Mississippi valley as far north as the Ohio.

Secretary Ragan, of Indiana—The pecan may be found in fine native groves as far north, in the Wabash valley, as the fortieth parallel of latitude. It only thrives on the alluvial soils of our river bottoms. Some years ago I was traveling in Northern Indiana and was quite surprised to find, at a point seventy-five or eighty miles due north of Indianapolis, in Fulton County fine, healthy trees, in bearing, of the English Walnut. I met a gentleman, recently, from that part of the State, and he told me that the trees, three in number, were still living and in perfect health. There are said to be trees of the English walnut growing at Vincennes, in our State, which were planted by the early French settlers.

Mr. VanDeman, of D. C.—I think the pecan will prove hardy anywhere that the black walnut will thrive. The English walnut is a failure in Kansas.

Mr. Lindley, of North Carolina—The pecan thrives in North Carolina. I believe it would be a profitable crop to cultivate. The trees are very difficult to transplant.

Mr. Greiner, of New Jersey—They transplant very readily at one year old. They should never be permitted to stand in the nursery longer than one year.

Mr. Albaugh, of Ohio—I believe nut growing might be made both interesting and profitable with us. We have fine native hickory and walnuts. The chestnut tree thrives in the Miami valley, but fails to mature its nuts. Can any one explain why this is? The burs form and grow to full size, but the nuts fail to materialize.

Prof. Claypole, of Ohio—This is an interesting subject, but we must not rely on the English walnut, Spanish chestnut, or even the pecan as reliably hardy in our latitude. The American sweet chestnut thrives in Northern Ohio, but it only succeeds on sandstone soils. I have not tried the European filbert, but if it is as subject to the attack of the nut weavil as our hazel nut I would not care to try it. I think we must look to the improvement of our native hickory nuts as the most certain source of success in nut culture. If we can thin down the shell and increase the size of the kernel, and yet retain its sweetness and flavor we will have produced a nut the equal of the best.

Mr. Boggs, of North Carolina—We occasionally meet with thin-shelled, sweet-meated hickory nuts in the mountains of our State that are certainly worthy of cultivation. We also have a dwarf chestnut, the trees of which only grow to a height of ten or twelve feet, which is fine.

Mr. Hollister, of Missouri—Wherever the pecan will succeed it will certainly pay to plant it. The native trees of the lower Mississippi valley have been shamefully destroyed by vandal nut gatherers. Pecans always sell readily, and especially if they are of the large Texas and Arkansas varieties.

Mr. Pierce, of Ohio—The Japanese chestnut will not succeed with us. Our sweet chestnut will not do well on clay soil, neither will it give satisfaction on our Western prairies.

Mr. Cook, of Michigan—A gentleman in our State planted a grove of nut-bearing trees about twenty-five years ago, and now it is the most profitable part of his farm.

Mr. Albaugh—All nut-bearing trees are difficult to transplant. The nut should be planted where the tree is to grow.

Mr. Williams, of Ohio—The chestnut seldom does well after being transplanted. It may not die, but will not bear fruit.

Mr. Greiner—The English walnut ranks with the peach in point of hardihood. Some varieties will succeed much farther north than others.

Dr. McKay, of Mississippi—A neighbor of mine, somewhat engaged in nut culture, assures me that all nut-bearing trees not only grow, but bear better, also, where they have not been transplanted.

Mr. Hollister—The great pecan forests of Southern Illinois have nearly all been destroyed and we now depend on Arkansas and Texas for our supply of nuts. In the South and Southwest no better paying crop can be planted than pecan orchards. As a market nut I do not think much of the chestnut. They are very easily spoiled and are so apt to become wormy.

Mr. Miller, of Ohio—An ounce of gum camphor to the barrel of nuts will keep the worms away.

President Earle—I am glad we have had this paper. We can

leave no better legacy to posterity than groves of forest trees, and especially nut-bearing trees.

Mr. Myrick, of Massachusetts, was then introduced and proceeded to read the following paper, by Mr. Hale, of Connecticut.

SMALL FRUITS IN NEW ENGLAND.

BY J. H. HALE, OF CONNECTICUT.

My subject seems to cover a rather broad field, but if you will come with me to the "Land of Pork and Beans," or the "Land of Steady Habits," or, in fact, anywhere "way down East," you will soon see that we are all confined to rather narrow (and not very long) fields of a few acres each, fenced in by solid stone walls or crooked rail fences, making many short rows and any quantity of hard and weedy fence corners to keep clean, which to some extent prevent us from broadening out and planting for market twenty five, fifty or even one hundred acres, as many of our brethren at the South and West are doing; and yet I think we are at the present time producing and eating more fruit than any other section of the country, yet its production for market is in the hands of many small cultivators, averaging, perhaps, not much more than one acre, while any one having eight or ten acres is considered to be quite largely in the business.

There are several causes for this, but the one great cause is the cost. Labor and manures are both high, and for a four- or five-acre plantation quite a little capital is required. For strawberries, say about $150 per acre, divided about as follows: Land rent, $6; plowing and harrowing, $4; manure, $50; plants, $20; summer cultivation, $50; mulching material for winter, $20. In the $50 for fertilizing I allow $35 for one ton pure ground bone and $15 for muriate of potash, which are now considered the best and cheapest sources of plant food that we can obtain for our fruits. If, in place of this, stable manure is used, either from the farm or purchased, the expense will be about $25 per acre more, and, as we seldom pick but one crop, this expense has to be kept up each year, although leaving the land in fine condition for other crops. Raspberries, blackberries and currants cost us about $75 per acre the first year, while the manure and cultivation of future years cost from $30 to $40 per acre.

Strawberries are mostly grown in matted rows three and one-half to four feet apart, although the best cultivators are slowly adopting the hill and narrow row systems. Raspberries, both red and black, are grown largely in hedgerows, six to seven feet apart, and the plants well pinched down to two and one-half to three feet. This is the general practice, yet those making the most profit out of their fruit plant in hills five to six feet apart each way, and tie to stakes five feet high.

Blackberries are not as yet planted to any great extent for market, the

earlier varieties requiring winter protection, and the later ones ripening too late to sell at paying prices in competition with the wild ones from the woods and peaches from Delaware; and yet the owner of one acre of Snyders near Springfield, Mass., told me last spring that the fruit from that acre in 1885 paid for 560 bushels of shelled corn delivered in his barn.

The cultivation of currants as a field crop has been sadly neglected. Being personally acquainted with most of the leading fruit farms in New England, I do not know of twenty-five acres of currants in all; and it is safe to say that one hundred acres would be a liberal estimate for all that are cultivated in New England, our markets being mostly supplied with this fruit from New York State.

Gooseberries are grown only in very limited quantities, and the same can be said of grapes, except a very small section in Eastern Massachusetts and Southwestern Connecticut, and yet tons upon tons of them are brought in from New York State all the fall. Why this branch of our business is so sadly neglected I can not say, for nearly all varieties succeed well in Connecticut, Rhode Island and Eastern Massachusetts, and the earlier ones all do well in the northern portions of New England.

In marketing strawberries, black-cap raspberries, blackberries, currants and gooseberries, the American square quart basket is used in the thirty-two-quart Delaware crate, which is returnable. Crates kept in good repair and well painted are used year after year, while the baskets are used till soiled and unfit for use, according to the taste and neatness of the growers, some using only white, clean baskets, while others are satisfied to use anything that will hold a quart of berries.

Within the last few years a few of us have had made an improved crate that is four inches higher than the old one, with a rack at each end to hold up the trays that sustain the baskets. This extra height allows us to fill our baskets heaping full of fine, large fruit, and place them on the market without the least crushing; and being in snowy white baskets, made of poplar wood (the whitest we can get), the fruit shows off to best possible advantage, and sells for highest prices, often from two to three cents more per quart than it would if put on the market in the old way, or in (must I beg pardon of our worthy President for saying it?) the unsightly square box and tight case as used at the West.

Red raspberries are mostly marketed in pint or half pint round Beecher baskets, keeping best and commanding highest prices in the smaller packages.

As to profits of the business. We have the advantage over any other section of the country of having small manufacturing towns and villages scattered all about, not more than ten to fifteen miles apart, and often much less, furnishing a home market for almost all our products, delivering with our own teams, and selling either directly to consumers or to the retail dealer, thus avoiding all cost of railway transportation, and saving cartage, etc., that our brethren of the South and West have to pay when shipping to

the larger city markets. Of course, some little fruit is sent to New York, and a very large amount to Boston; yet by far the largest bulk of the crop is sold and eaten the same day within ten miles of where it is picked. Yet with these advantages we are none of us getting rich out of the business. Some are only just making a living, while others are losing money and fast becoming discouraged with the low prices that have ruled the past few years. We hear all about the one successful cultivator that succeeds in producing 6,000 to 8,000 quarts of strawberries or 4,000 to 5,000 quarts of raspberries per acre, and sells them at fifteen to twenty cents per quart, while nothing is said of the "ninety and nine just men" and fruit-growers that get only 1,500 to 2,000 quarts per acre, and sell them at five or six cents per quart. As a dealer in plants, I might be expected to "boom" the business a little, yet at present I would advise those that are well established in the business to hold on and not get discouraged, to cultivate less acres and give better care to what they have, while "new beginners had better not begin."

The laboring classes are our largest and best consumers of fruit when they have the money to buy with, using four to six quarts of berries per day in many families, while the millionaire's family are satisfied with one or two quarts. Start up all our mills, factories, mines and shops; increase the wages of our working classes, and stop licensing rum and beer shops, to rob the laborer and his family. Then small fruit growers will be able to sell all their products at good-paying prices.

As to the family small fruit garden, that is a growing institution with us. Twenty-five years ago, in my own town of some 4,000 population, two small beds of Wilson's Albany strawberries were all that were grown. Now many families are supplied with a great variety of small fruits throughout the whole season; but as the most of it is still confined to small gardens, where most of the work of cultivation has to be done by hand labor, hence the feeling among many, especially farmers, who are busy with other field work, that it is cheaper to buy what fruit the family wants than to grow it. However, some of our farmers are learning to take the fruit as well as vegetable garden out in the field, planting in as long rows as possible, and making the horse and cultivator do most of the work. In this way one-half acre is often made to furnish $150 to $200 worth of health, comfort and enjoyment each season.

A friend having a little over one-third of an acre highly cultivated in the choicest varieties of small fruits told me early in August: "At market rates, our little patch has furnished our family of six $116 worth of berries since May, and we will have blackberries into September and grapes till December." This is an exceptional case, perhaps, yet shows how well a family can be supplied if they only will.

As to varieties, that question, like the tariff, is "a local issue." Unless we want to "demoralize business," perhaps the less said about it the better; yet by a general summary of notes of over one hundred correspondents, and my own experience and observation, it is safe to say that one-half of all the

strawberries grown for market in New England are Crescents, the other half being largely made up of Miner, Sharpless, Manchester, Windsor and Downing; and, with the exception of Windsor, the same are mostly grown for family use. Yet some cultivators who prefer quality to quantity are planting the higher flavored but less productive varieties.

Of raspberries, either for home use or for market, the standard favorites are Cuthbert for red and Souhegan and Gregg for black.

The cherry currant is mostly grown for market, except by a few of us that have learned that the Victoria is more productive, larger in bunch and, ripening later, sells for higher prices; while for the family garden Red Dutch, White Grape and Cherry are grown.

Snyder and Wachusett Thornless blackberries are our market varieties, and for home use we add the Kittatinny.

Downing and Smith's Improved gooseberries for family use, and the Downing alone for market, are all that are grown to any extent.

Many new varieties have been and are constantly being tested, and every year we are adding something valuable to the standard list. Just at the present time the most promising are Jewell, Belmont and Bubach strawberries, Rancocas, Scarlet Gem, Golden Queen, Carman, Earhart and Springfield raspberries. None of the newer blackberries promise to be as reliable as the older ones I have named. Lucretia dewberry is fulfilling all the promises made for it by its Ohio friends, being very productive of extra large berries that are of the same excellent quality as the wild native dewberry, and ripen extremely early. Fay currant is an improvement on any of the older varieties, the berry being as large or larger than the Cherry, while the clusters are often four to five inches long. None of the newer gooseberries have as yet been well enough tested to admit of speaking of their merits. Worden, Moore's Early and Concord are our most profitable market grapes, the Worden growing more in favor each year. For family use all but the very late ripening varieties can be and are grown to perfection, especially by amateur growers in our cities and towns, who are showing us what can be done even on a small plot of ground. Some of them have fifty to sixty varieties on a small city lot.

On the whole, we are making great progress in our taste for the cultivation of these choice gifts of nature, and are learning to depend on them for a large share of our regular food supplies during the summer season. Once considered luxuries, they are now, and ever will be, a staple article of food in every real home; and home without a fruit garden to me seems like no home at all. Yet there are thousands of families who still know but little of the health and joy to be found in choice fresh fruit, seldom having any except a few wild ones gathered from the woods or fence corners by the girls or poor, tired mother after the day's work in the care of the household is done. It is for these that a part of our work as a Society should be given. By meeting together, talking together, and in general acting together, we shall do much for our own advancement in our glorious profession; and by

the aid of that great engine of progress, the press, if we can scatter seed of horticultural light and knowledge into the minds, hearts, hands and gardens of every home, not only in New England, but all over this broad land, we shall feel that we have our reward.

DISCUSSION ON SMALL FRUITS.

President Earle, of Illinois—This is one of the brightest and most incisive papers we have had. The author is thoroughly familiar with his subject. In the discussions following we will first take up the strawberry.

Mr. Green, of New York—We have made rapid progress in the improvement of strawberries in the last few years. The Bubach Jewell and Belmont are promising new sorts.

Mr. Ohmer, of Ohio—Now, that we have gotten into the strawberry patch, I would like to have my friend Albaugh tell you about strawberries at Barnesville, in this State. I call on him because he is not a bashful man, and because he was there and saw the berries for himself.

Mr. Albaugh, of Ohio—It was my good fortune to accompany the State Horticultural Society to Barnesville, in the hill country of Eastern Ohio, last June, and I must say that I was astonished at the immensity of the strawberry business in that vicinity. The fields (for they are not patches) of strawberries are simply immense. This land was formerly cultivated in tobacco. A few years ago the people abandoned tobacco culture and went into the strawberry business. The Sharpless is the leading variety. They are planted and cultivated in hills, all runners being kept off. The berries are very large, and none but the best are sent to market. I counted several quarts that ranged from twelve to sixteen berries to the quart. The land is a heavy clay and thin. The chief fertilizer is stable manure. The land is quite hilly, and as you go up one hillside and down another, there is nothing but strawberries. Their markets are Detroit, Cleveland and Chicago. They allow no bad berries to go from Barnesville. In this way they keep up the reputation of their berries. The day we were there (the 10th of June), they shipped twelve hundred bushels of berries. The peo- of Barnesville have fully demonstrated what can be done on lands scarcely fit to grow ordinary crops of wheat.

Mr. Ohmer—Some one asks how they gather twelve hundred bushels of strawberries in a day. This is a business at Barnesville, and as soon as the strawberry season begins all the schools are dismissed and everybody, old and young, goes into the strawberry fields and picks berries.

Mr. Pierce, of Ohio—At Barnesville they claim to produce an average of from one hundred and twenty to one hundred and forty bushels of strawberries to the acre.

Dr. McKay, of Mississippi—I have been largely engaged in strawberry culture since 1873. Our mode of culture is very different from yours. We cultivate in matted ridges, which are thrown up by the plow in preparing the land for the plants. As a rule, one plantation lasts about five years. The Wilson was formerly our chief berry, but of late years the plant has become somewhat feeble. This is especially true after a warm winter. After a cold winter the Wilson plant is still reasonably vigorous. The Crescent and Neunan are now the leading southern berries; the Neunan, especially, succeeds better than any other in the extreme south. Our crops range from twenty-five to seventy-five bushels per acre. Our markets are north—principally Chicago, St. Louis and Cincinnati. It is seldom that we find a good market in New Orleans. We ship in quart boxes, in twenty-four quart cases, and rarely have them reach market in bad condition. The Cumberland is a very fine berry in the south. The Sucker State promises well. We do not fertilize our land to any great extent. Cotton seed hulls are used as a mulch, also crab-grass. I have sometimes used cotton seed meal and wood ashes as fertilizers. Considering our locality, soil and distance to market, the Wilson still stands first in value, next the Crescent, and third the Neunan, sometimes called the Charleston.

Mr. Caywood, of New York—Has any one tried the Bubach?

Mr. Green, of New York—I have grown it quite largely, but not fruited much. Think it will prove valuable.

Mr. Miller, of Ohio—It is a very promising, hardy, large berry.

Mr. Ford, of Ohio—Have had it fruit. It is only a medium grower.

Mr. Albaugh—It is a fair grower with me.

President Earle—The subject of transportation is one of great importance. Unlike Mr. Hale, we must depend on distant markets. We can not afford to use return packages. When we ship a case of strawberries, we no more expect the return of the empty case and boxes than we do to get our empty apple barrels back after the apples are sold. We ship strawberries and black raspberries in quart boxes, and red raspberries in pints. By the use of refrigerator cars, we have no trouble in shipping our berries to Chicago, or even to Detroit and Cleveland, in good condition.

Mr. Smith, of Wisconsin—At what stage of ripening do you pick Crescents for these long shipments?

Mr. Earle—We pick the Crescent when they are fairly colored. The Wilson and Crescent will color up nicely after they are picked; the Sharpless will not. It must be fully ripe when picked.

Mr. Caywood, of New York—Gift packages are good, but they cost us too much.

Mr. Earle—We make our own packages, and they cost fifteen cents each for the crate, and two-thirds of a cent each for the boxes, or thirty-one cents per case.

Mr. Smith—Our quart boxes cost us about $3 per thousand.

Mr. Caywood—The worst feature of the whole business of marketing fruits is the transportation. After the most careful handling we can give them, they fall into the hands of the half-civilized crews of transportation companies, where they are chucked and banged into a jelly before they reach the consumers, if not, indeed, before our own eyes. Under such circumstances it is hard to resist the desire to kick somebody.

Mr. Ford—President Earle, what kinds are mostly shipped from Cobden?

Mr. Earle—The Crescent is grown greatly in excess of any other kind, if not of all others.

President Earle suggested that the subject of small fruits be continued to the evening session; after which the Society adjourned to meet at 8 P. M.

Second Day—Wednesday.

EVENING SESSION.

The Society reassembled at 8 P. M., President Earle in the chair.

The first business of the evening session was the appointment of the following committee to nominate officers for the ensuing year: Messrs. Smith, of Wisconsin; Van Deman, of District of Columbia. Hollister, of Missouri; Ohmer, of Ohio; Pratt, of New York; Dr. McKay, of Mississippi; Lindley, of North Carolina; Cook, of Michigan; Ragan, of Indiana; Mesler, of Illinois; Greiner, of New Jersey; Markle, of Arkansas; Myrick, of Massachusetts; and Bell, of Kentucky. The committee was also instructed to recommend a time and place for holding the next meeting of the Society.

DISCUSSION ON SMALL FRUITS—RESUMED.

Prof. Lazenby, of Ohio—Matthew Crawford, of this State, who is present, is one of our best posted small fruit cultivators. I should like to hear from him on the new strawberries.

Mr. Crawford, of Ohio—I am testing a large number of new varieties, but hardly feel warranted in speaking of them now.

Prof. Green, of Ohio Experiment Station—Jewell is a promising variety, but not of very good quality. Crawford's No. 6 is very good and of heavy weight. Bubach is excellent on one year plants. The Jessie is one of the most promising; plant vigorous, healthy and productive. May King very promising, large as Crescent. Scovil early, but small. Perry not as satisfactory as last year. Ontario, plants vigorous, berries large and of good quality; as it was the first year, could not decide as to its fruitfulness. Ohio like Kentucky, but more fruitful.

Mr. Smith, of Wisconsin—The Wisconsin Horticultural Society met at Janesville last June. During the session the Society visited Mr. Louden's place and saw his Jessie strawberry. It was a grand sight. The fruit is very large, firm, and of good quality. The crop was enormous. The members of the Society were greatly enthused by the visit. The soil on which they grew is a gravelly

loam with clay subsoil. If it does as well elsewhere as on Mr. Louden's place, it must prove a popular and valuable sort.

Mr. Crawford—I have fruited the Jessie twice and find it very satisfactory. It has not exhibited a single weak point.

Mr. Albaugh, of Ohio—The Western Union originated near Dayton. It is of the Cumberland type, with fine healthy foliage.

Mr. Miller, of Ohio—Mr. Louden claims to have realized two hundred bushels per acre from his six acres of Jessie, notwithstanding the extreme drouth of this last season.

President Earle—The worst enemy our strawberry growers have is the tarnished plant bug. I would like to know if other sections are troubled by this pest? It is a small green bug, which sucks the juices out of the green berries, causing them to grow out of shape, with dry, hard, shrunken points, what we call "buttons." A large per cent. of the fruit is thus affected. We know of no sure remedy. If any gentleman present can give a remedy he will have conferred a great favor on Southern Illinois strawberry growers. I do not know its habits of breeding, etc., but it is always on time for the partial destruction of our crops.

Mr. Pierce, of Ohio—We raise some "buttons," especially among our Manchesters. Some have thought this deformity due to imperfect fertilization of the flowers. We are, however, troubled more with "buttons" in our apple and pear crops than with the strawberry.

Mr. Wood, of Ohio—This insect is quite troublesome with us at Akron. It does not confine its work to strawberries, but affects currants and other fruits.

Mr. Smith—We have been troubled with these insects, but for some years I have practiced planting on ground which had received previous clean culture. I also turn under the old plants as soon as the fruit is picked, and thus destroy all insects. By this method I have succeeded in raising perfect fruit.

Mr. Myrick, of Massachusetts—The cut-worm is one of our worst enemies in New England. Before planting we dip the roots of our plants in a weak solution of Paris green, which kills all insects that may be adhering to them.

Mr. Smith—How does the Fay currant succeed?

Mr. Crawford—The Fay is much like the Versaillaise, but more productive.

Mr. Caywood—The Fay is a success.

Mr. Greiner, of New Jersey—It is valuable in our State.

Mr. Albaugh—Some one has credited E. Y. Teas, of Indiana, with being the introducer of the Lucretia dewberry. My brother, B. F. Albaugh, of Covington, Ohio, is the real introducer of this fine variety. He was a soldier in the Union army, and while stationed in West Virginia, took notice of some fine dewberries growing wild. He visited the locality after the war and secured plants, which, under cultivation, have greatly pleased all who have given them a trial. It is really a most valuable variety.

Mr. Caywood—The Lucretia is truly a wonder. It is several days earlier and much finer than any blackberry with which I am acquainted.

Mr. Crawford—It is all that its friends have claimed for it. It propagates from tips, but may be grown from root cuttings, the same as blackberries.

Mr. Lindley, of North Carolina—The dewberry is a common and valuable fruit on the waste lands of North Carolina. Some of our native varieties are very fine.

Mr. Boggs, of North Carolina—I wish to corroborate what friend Lindley has said. Our dewberries are earlier, larger and more luscious than the blackberry.

Mr. Albaugh—They do best to let them run on a mulched surface. The fruit is then clean and free from dirt. Sorghum bagasse is very fine for this purpose.

Mr. Van Deman—The Dallas, a variety originating in Texas, and which seems to be a hybrid between the dewberry and the blackberry, is becoming very popular in that State.

Mr. Caywood—The Minnewaski blackberry is our most promising variety. The fruit is of Lawton size, very productive and hardy.

Mr. Green—I saw the Minnewaski at Mr. Caywood's, and was pleased with it.

Mr. Reynolds, of New York—I also visited Mr. Caywood, and was pleased with his blackberry, the Minnewashi.

Prof. McKay, of Mississippi — When should blackberries be pruned?

Mr. Caywood—I prefer spring pruning. Summer pruning induces a spreading habit, which I do not like.

Prof. Troop, of Indiana, then read Mr. Kingsbury's paper, as follows:

AMERICAN HORTICULTURAL ORGANIZATIONS—THEIR PERPETUITY AND EFFICIENCY.

BY J. G. KINGSBURY, OF INDIANA.

It is but proper to say that my subject, together with several points in its treatment, was suggested by our Secretary, who has thought much upon it, and whom I vainly attempted to persuade to present it before you.

The object of this association is the promotion of horticulture. The promotion of horticulture means improved varieties of vegetables, fruits and flowers; it means more and better apples, pears, grapes and peaches; it means better health, longer life and greater happiness for the people. It means more than can be told in the introduction to a short essay. And because it means so much, because so much depends on this and other societies having the same purpose in view, it is of prime importance that whatever is done in this direction should be done in the most careful and thorough manner possible, and that the conclusions reached on all points discussed should be published as widely as possible among those likely to be benefited by them. It is not according to the spirit of the true horticulturist to conceal from the public any valuable information of which he may become possessed. The pursuit of horticulture is of divine origin, and imparts to its devotees a share of the beneficent spirit of its great author and first patron. It is matter of frequent comment with what generous freedom the experienced fruit culturist or florist imparts to the novice the results of his dearly purchased knowledge. It would be a pleasure and an encouragement to the gentlemen who read and discuss the practical papers before this convention to know that their thoughts and experiences would be read by tens of thousands throughout the land, and the Society would take a nobler pride in its mission if this were true, and would have a far stronger assurance of perpetuating its existence and increasing its efficiency.

A National Horticultural Society should number its members by the ten thousand. Its sphere of usefulness should include every township in every county of every State in the Union. Its utterances should be so well considered and so reliable as to be worthy the hearing and regard of all who

are interested in practical horticulture in whatever corner of the land; for horticultural products of some varieties may be grown in all parts of our favored clime and country.

It would seem, then, to be the duty and highest interest of this and similar societies to cultivate a combination of effort, whereby increased efficiency and dignity may be secured, and such confidence and respect be inspired among those engaged in horticultural pursuits as to prompt them to seek for membership, and to prize it as honorable and profitable in a high degree. The reports of proceedings of such an association, properly edited, condensed and systematized, would have a value almost beyond estimation to the intelligent horticulturist, who would readily acknowledge that he could not afford to be without them.

To effect this consummation, "so devoutly to be wished," it will be necessary to negotiate with other national societies representing special branches of horticulture, with a view of uniting under an appropriate name, and arrange for holding perhaps biennial sessions of the general organization, with annual meetings of subordinate divisions or sections. At the meetings of the parent society the work to be done should be classified, somewhat in the admirable manner adopted by the American Association for the Advancement of Science, each department appointing its committee of specialists, to whom all communications, queries and details of experiments in their line should be referred, and whose duty it should be to discuss and report to the association, in general session, upon whatever might seem of sufficient importance to claim its time and attention; making such brief and comprehensive reports on other matters as their best judgment might dictate. By such systematized arrangement a vast amount of most valuable matter would be brought into shape for publication in the biennial reports, and the transactions of the society would command such a degree of confidence and respect as they could not otherwise hope ever to secure.

By the great mass of horticulturists not yet identified with either of the existing societies in that interest such a union of effort on the part of these organizations would be hailed with delight. If rightly inaugurated, no detriment to any worthy interest could ensue, while much good in many directions must result. Of the many benefits to grow out of such union not already referred to would be a financial condition which would justify the employment of a competent Secretary and assistant, whose position and duties would be permanent, and whose services would be available at all times to all members of the society on all matters of advice and information within their power to bestow.

The subject is one which grows on the mind as it is thought upon, and is, I respectfully submit, worthy the serious consideration of the association.

DISCUSSION ON MR. KINGSBURY'S PAPER.

Mr. Caywood, of New York—The ideas embraced in this paper are just what I predicted at New Orleans, when the name of this

Society was changed, would come about. That movement was an aggressive one, and this paper proves it. There is too much territory embraced in the title of this Society. We need a good sectional society with headquarters on the Hudson, another for the great Mississippi valley, and yet another for the Pacific coast. It is too expensive to get together from such a wide range of territory.

Secretary Ragan, of Indiana—My experience in an official capacity has long since convinced me that we need, not more, but *better societies.* I confess to having suggested the topic and something of the outline of thought expressed in this paper. My desire is to see an *American Horticultural Society*, with auxiliary branches dedicated to *Pomology, Forestry, Landscape Gardening, Vegetable Gardening,* the *Nursery, Floriculture,* etc., each working in unison with the head and as part of the great central organization, with one membership fee covering the whole, one volume of transactions embracing the proceedings of the whole, and meeting at the same time, in the same city, in joint sessions, or by sections, as may be determined by previous arrangement. Then, and not until then, will we have such an organization as will command the attention and respect of the world. Then our meetings will be attended by those interested in horticulture in any of its branches. Then a membership in this great organization should be elective, and not open (and begging) to any one who can raise the necessary dollar, two dollars, or four dollars, that now renders him eligible, and should carry with it an honor to be proud of, if not a title (as, for instance, Fellow of the American Horticultural Society—F. A. H. S.) As it is, it is too great an expense of time and money to attend, or even keep up membership in the various kindred meetings, however much we may feel interested in them; and as a result they are all half starved, half fed, and almost unknown beyond a limited circle, and, as our late experience proves, none are able to command even the respect of railroad officials. As already said, I can only see in this question one of self-perpetuation and prosperity, or of obscurity and oblivion. It behooves us to calmly consider and carefully weigh the importance of this subject. With such an organization, embracing the whole field of horticulture and the whole territory between the oceans, looked up to and supported by the State, county and district societies throughout the land as the recognized head of one great

system; then may American horticulture justly claim its proper rank among the civilized people of the world.

Mr. Van Deman, of District of Columbia—Too many societies make too much machinery, and too much expense in time and money to attend and keep up with them. Above State organizations I should like to see one American Horticultural Society.

Mr. Hubbard, of New York—I agree with Mr. Van Deman in regard to too many societies. I have no doubt but this and the American Pomological Society weaken each other, whereas they should be mutually helpful. I see one objection to these large meetings: the difficulty of finding cities large enough to accommodate all at one time with hotel and hall room.

The Society then adjourned to meet at 9 A. M. to-morrow.

Third Day—Thursday.

MORNING SESSION, September 9.

At 9 o'clock the Society was called to order by President Earle.

Mr. Ohmer, of Ohio, from the committee on pears on exhibition, made the following report of awards:

Best and largest collection of pears—First premium, Frank Ford & Sons, Ravenna, Ohio.

Best plate of Mary—First premium, R. A. Hunt, Euclid, Ohio.

Best plate Bartlett—First premium, C. D. Bishop, Cleveland, Ohio; second, W. C. Gilbert, Mentor, Ohio.

Best plate Tyson—First premium, R. A. Hunt.

Best plate Seckel—First premium, W. C. Gilbert; second, R. A. Hunt.

Best plate Clapp's Favorite—First premium, Frank Ford & Sons.

Best plate Kirtland—First premium, Frank Ford & Sons; second, R. A. Hunt.

Best plate Boussock—First premium, Frank Ford & Sons.

Best plate Keiffer—First premium, J. Van. Lindley, Pomona, N. C.; second, Frank Ford & Sons.

Best plate Duchess—First premium, N. Ohmer, Dayton, Ohio; second, R. A. Hunt.

Best plate of any variety—First premium, W. C. Gilbert; second, R. A. Hunt.

Mr. Campbell, of Ohio, submitted the report of awards on grapes, as follows:

Best and largest collection of grapes—First premium, L. Harms, Euclid, Ohio; second, Eastern Cuyahoga Horticultural Society, Euclid, Ohio.

Plate of Moore's Early—First premium, L. Harms.

Plate of Worden—First premium, W. N. Cook, Grand Rapids, Mich.; second, J. H. Tryon, Willoughby, Ohio.

Plate of Concord—First premium, J. W. Maxwell, Euclid, Ohio; second, O. Miller, Unionville, Ohio.

Plate of Delaware—First premium, J. H. Tryon; second, S. B. Upham, Mentor, Ohio.

Plate of Brighton—First premium, Cushman & Son, Euclid, Ohio.

Plate of Pocklington—First premium, J. W. Maxwell; second, George W. Campbell, Delaware, Ohio.

Plate of Empire State—First premium, Pratt Brothers, Rochester, N. Y.; second, Geo. W. Campbell.

Plate of Catawba—First premium, J. W. Maxwell; second, S. L. Durham, Collamer, Ohio.

Plate of Niagara—First premium, W. N. Cook; second, L. Harms.

New Named grape—First premium, A. J. Caywood (to Ulster Prolific), Marlboro, N. Y.; second, same.

Mr. Van Deman, of District of Columbia, presented the following awards on apples:

Best and largest collection of summer and fall apples—First premium, Allen County, Kansas, Horticultural Society; second, Dr. H. E. McKay, Madison Station, Miss.

Plate of Chenango Strawberry—First premium, L. B. Pierce, Talmadge, Ohio; second, W. N. Cook.

Plate of Maiden's Blush—First premium, L. B. Pierce.

Western Beauty—Second premium, L. B. Pierce.

Plate of Star—First premium, L. B. Pierce.

Plate of Ohio Nonpareil—First premium, L. B. Pierce; second, Frank Ford & Sons.

Plate of Fall Pippin—Second premium, H. G. Tryon, Willoughby, Ohio.

Plate of Alexander—Second premium, H. G. Tryon.

Mr. Ohmer, of Ohio—Before making the following report on peaches and plums I wish to call attention to a box of ripe peaches which have been shipped to this meeting from Baltimore. They are in perfect condition, as you can see. The package is arranged with pasteboard partitions similar to those used in shipping eggs.

Best and largest collection of plums—First premium, R. A. Hunt.

Six varieties of plums—First premium, H. Beach, East Rockport, Ohio; second, R. A. Hunt.

Plate of any variety of plums—First premium, R. A. Hunt; second, P. Diemes, Cleveland, Ohio.

Best and largest collection of peaches—First premium, W. N. Cook.

Plate of Barnard—First premium, H. G. Tryon.

Plate of Crawford's Early—First premium, M. E. Sweet, Kirtland, Ohio; second, W. N. Cook.

Plate of Old Mixon Free—First premium, H. G. Tryon; second, W. N. Cook.

Plate of Yellow Rareripe—First premium, M. E. Sweet; second, L. B. Pierce.

Plate of Large Early York—First premium, H. G. Tryon.

Plate of Late Crawford—First premium, M. E. Sweet; second, L. B. Pierce.

Plate of Smock—First premium, L. B. Pierce.

Plate of New Seedling peaches—First premium, H. G. Vorce, Euclid, Ohio; second, H. H. Newton, Euclid. Ohio.

Mr. Harrison, of Ohio, made the following report of awards on Plants and Flowers:

Best collection of plants in pots—*Ohio Farmer's* special premium of $25, Edwin Geering, of Cleveland; second premium, $15, D. Charlesworth, of Cleveland.

Best floral designs—White Sewing Machine Company's special premium of one machine, valued at $50, Mrs. Ella Grant Campbell, of Cleveland; second premium, $15, J. M. Gasser, of Cleveland.

Collection of cut flowers—First premium, Mrs. Ella Grant Campbell.

Collection of gladioli—First prize, Matthew Crawford, of Cuyahoga Falls; second prize, Mrs. Ella Grant Campbell; special mention, Thorpe's greenhouses of New York, exhibit not entered.

Collection of dahlias—First prize, J. R. Sked, of Cleveland; second prize, Mrs. E. G. Campbell.

Collection of geraniums—First prize, Peter Herke, of Cleveland; second prize, Mrs. Ella Grant Campbell.

Collection of cut asters—First prize, Peter Herke.

Collection of begonias, in pots—First prize, Edwin Geering; second prize, Mrs. Ella Grant Campbell.

Collection of coleus, in pots—First prize, Edwin Geering.

Collection of asters, in pots—First prize, Peter Herke.

NOTE.—The following, clipped from one of the Cleveland dailies, is a worthy tribute to the pluck and energy of a lady who con-

tributed very largely to the fine exhibit of plants and flowers which adorned the hall:

"In the report of awards of premiums for flowers, Mrs. Ella Grant Campbell won several prizes. Her history is an example of what may be accomplished by a plucky girl. Her family meeting with financial reverses, she had little capital except her energy. She had a taste for flowers, and with a capital of but fifteen cents, she began growing them in a small way. Her first success was in winning a prize at the Northern Ohio Fair, and winning it over the heads of old and experienced florists. She won national reputation by her floral designs at the Garfield obsequies. Now she has a greenhouse and a flower studio of her own."

President Earle, on behalf of the Society, thanked the citizens of Cleveland and Ohio who had made this very excellent exhibition of fruits and flowers possible.

The Committee on Nominations, through Hon. J. M. Smith, of Wisconsin, chairman, having reported recommending a full list of officers, including State, Provincial and Territorial Vice-Presidents, they were, on motion of Mr. Ford, of Ohio, unanimously elected. (See list of officers.)

The same committee, which had also been charged with the duty of reporting on time and place of next meeting of the Society, reported recommending that the meeting be held in February, 1888, and if acceptable railroad rates could be secured, that the meeting be held at some point in California.

After some discussion, in which all seemed agreed as to time and accepting the conditions recommended as to place, the report was adopted and the committee discharged.

President Earle thanked the Society, in a few pleasant words, for frequent honors; after which he suggested that the Secretary might be excused from the room for a few minutes.

NOTE.—The Secretary, on his return to the room, found advantage had been taken of his absence to make up a purse, by donations, for his benefit, and that the sum of $158 had been donated. Believing that this plan of raising money to pay a Secretary for his services, if frequently resorted to, would permanently injure the Society, but at the same time thanking the generously disposed friends who had contributed to the fund, the Secretary suggested that each contributor should report a number of names, of his friends (not now

members of the Society), corresponding to the amount which he was giving, and have them made members. In this way the Society would be built up, while the generous object sought would certainly come about when our membership list was sufficiently large. This suggestion was generally acted upon, a fact which will explain to certain friends of horticulture throughout the land, who will find their names, for the first time, recorded as members of the American Horticultural Society. SECRETARY.

The Executive Committee was instructed to decide upon the place of the next meeting, provided acceptable arrangements can not be made to hold the same in California.

Mr. Campbell, of Ohio, from the committee appointed to consider the President's address, made the following report:

REPORT OF THE COMMITTEE ON PRESIDENT EARLE'S ADDRESS.

There were several points in the President's address which the committee deem of special importance and worthy of extended notice, and, perhaps, of further discussion by the Society:

The establishment of a Bureau of Pomology in connection with the Department of Agriculture at Washington;

The creation of a commission of pomological experts, to investigate the fruits and culture of foreign countries, especially the interior regions of Europe and Asia, with the view of obtaining valuable products suited to the wants of this country;

The endowment of Experiment Stations in connection with all the agricultural colleges of the country;

The Forestry question. To call the attention of our people and their legislators to the overshadowing importance of some practical method by which the conservation of our remaining forests may be attained and their destruction prevented; and also to the need of some uniform system of planting for the future;

The devising of some practical mode for the better and more equal distribution of our fruit crop to all parts of the country.

In addition, the committee, after due consultation, decided that the importance and value of the many good suggestions contained in the address would render desirable the publication of not less than *two thousand* copies, in pamphlet form, for general distribution, to be sent to the leading horticultural papers of the country, and to such other persons as would be interested and benefited thereby, thus creating additional interest in this Society and its work. Perhaps no better way could be devised for increasing the

membership in the Society and inducing others to join in its good work, than through the dissemination of this address, which so ably sets forth its aims and objects, not only for the welfare of its members, but, as well, for the good of the whole country.

Understanding that the financial condition of the Society would not warrant the undertaking of this work without some additional aid from its members, several of the committee expressed a willingness to contribute for this worthy object from one to two dollars each, and it was believed that, upon a proper presentation of the subject, other members would feel it both a privilege and pleasure to aid the Secretary in carrying out the recommendations of the committee for this publication. Your committee would therefore request that all who feel disposed to help in this matter, pay at once, for the use of Secretary Ragan, such sums as their liberality and the importance of the subject may suggest. Mr. Van Deman, having expressed a willingness to receive subscriptions for this purpose, your committee would recommend that he be appointed a committee of one for this purpose, with such assistants as may be necessary to the successful carrying forward of this work.

GEO. W. CAMPBELL, of Ohio,
PROF. JAMES TROOP, of Indiana,
PROF. H. E. VAN DEMAN, of D. C.,
DR. H. E. MCKAY, of Mississippi,
FRANK H. LEAVENWORTH, of Michigan,
CHAS. A. GREEN, of New York,
J. VAN. LINDLEY, of North Carolina,
E. T. HOLLISTER, of Missouri,
W. P. MESLER, of Illinois,
TUISCO GREINER, of New Jersey,
Committee.

NOTE.—The report of this committee was heartily approved by the Society, and a small sum raised for the purpose named, which has enabled the Secretary, through the very generous proposition of the Leavenworth & Burr Publishing Company, of Detroit, Mich., to distribute two thousand copies of the address, and from numerous responses, they have been most favorably received and highly appreciated. SECRETARY.

President Earle—Since the subject of the division of pomology has been mentioned, I am reminded that the Chief, whom we have with us, has a paper on this topic, which I will now request him to read.

POMOLOGY AS A DIVISION OF THE DEPARTMENT OF AGRICULTURE.

BY H. E. VAN DEMAN, CHIEF, WASHINGTON, D. C.

Your Secretary has urged upon me the duty of responding to the topic opposite my name upon the programme, and I have determined to keep in mind his hint concerning the "shortness of life." We are all aware that pomology has never been treated by the general government with the consideration that is due it. Why this is so we will not say; but possibly some of the blame rests upon ourselves, who are and have been the most directly interested in the matter. Be that as it may, it is with pleasure that we consider the fact that, after urgent and continued appeals to Congress by the present honorable Commissioner of Agriculture and many other friends of the cause all over the United States, an act has been passed establishing pomology as a division of the Department of Agriculture—directing the Commissioner to appoint a Pomologist, and appropriating, besides his salary, $3,000 to be used in carrying on the work of the division this year. As perhaps all of us have reason to know, this was accomplished only by the united efforts of many stanch workers. The members of the Committee on Agriculture in the House, and especially the Senate Committee on Agriculture and Forestry, were loyal in this particular case to the cause of their constituents.

Had not the Senate committee amended the bill, there would not now be a cent for the expenses of the division; and had not Commissioner Colman been persistent, this amendment would not have been made. It is, indeed, but a pitiful sum that has been appropriated to advance the interests of pomology in this great nation; but it is *something*, and if we are able to use it wisely it may be, as one has expressed it, "the entering wedge." My reason for consenting to appear before you at this time, you who are mostly older and wiser than myself, was that ideas might be called out, and the best and most practicable of them used in the work of the division.

I will briefly state some of the objects which have presented themselves, or have been suggested to me, as desirable to be reached; but let it be distinctly understood that their fulfillment depends upon the co-operation of the friends of pomology in all the States, and that Congress shall appropriate sufficient funds to meet the expense.

Perhaps one of the most useful things that might properly be undertaken by the division of pomology, provided means are given for that purpose, would be the establishment and maintenance of experimental stations where they would best serve the greatest number, and at the least cost. Experiments are necessarily expensive, and often abortive, and it might not be entirely practicable to have one for each State, but rather one for each district, embracing approximately similar conditions and needs. Too much machinery, and especially costly machinery, is to be avoided. Private experi-

mental grounds already under way and those of the agricultural colleges might, at least in some cases, be enlarged, assisted and utilized. Carefully prepared reports of accurate work by such stations might be used as the base of more general experimentation by the people. In short, it seems at least reasonable to expect that pomological experiments should be not only extended and backed by the government, instead of depending entirely upon private exertions, but the whole might be made more available by united and systematic endeavor and timely reports of the results.

Another matter now utterly neglected by our national government is the gathering of statistics of the pomological industry of the United States, except that done by the census bureau. A system might be inaugurated which would get at the real magnitude of the industry, its progress and its possibilities. The production and consumption of fruits, both fresh and cured, is in value perhaps scarcely less than that of the cereals, and it is only fair that similar attention be given in the collection of information and its proper dissemination. Foreign markets should also be investigated with a view to benefiting the home producer.

Careful investigation of the value of new fruits, and old ones of a special interest, and their adaptability to the various sections of our country, deserve prompt and personal attention by those who may be skilled in pomological matters. The same person should examine our fruits as they are found growing under the diversified conditions of soil, climate and culture. By this means safer conclusions can be reached than when observations are made by different persons. Experimental grounds, both public and private, might be visited, also fairs and fruit shows, where items of information could be gathered, and published for the general good. We need to know the real facts, whether good or bad, about our fruits. Perhaps it might be well to collect and arrange a cabinet of models accurately representing the size, shape and color of the fruits of the United States, both native and exotic. The Bartlett pear might be shown as it grows in New England, in Ohio, and another specimen from California; the Ben Davis apple, representing its typical characteristics in Wisconsin, Kansas and Texas; the Mediterranean sweet orange as it grows in Florida and California. A written description of each particular specimen should accompany the model, together with that of the plant or branches and foliage. In this way, in time, there might be placed before the student of pomology such an opportunity as is afforded by the Smithsonian Institute for zoological study. The nomenclature of our fruits also rightly claims attention at our hands. The American Pomological Society has, very properly, taken the initial steps to correct and disentangle the names of old varieties and properly direct the naming of new ones. The Society that I now have the honor to address has indorsed this action, and adopted the rules laid down by the former, and so have many of the State horticultural societies. If there is any way by which the division of pomology can aid in the work it should be done. Just how this aid can best be given is a matter for consideration.

The annual reports of the division might contain collections from State reports, together with whatever other matter of general interest may be gathered. These reports might, in a measure, supply the want of State reports where such are lacking. Bulletins could be used for the more speedy and timely publication of matter of special interest.

These are some of the thoughts that at present seem uppermost in my mind, but we can readily see that it would take years of patient work on the part of those directly in charge, and the cordial support of the friends of the cause all over the nation. Perhaps one element of success may be in not attempting too much. One thing is certain: "The garment will have to be cut according to the cloth," so far as expenditures are concerned. We can all do something toward the efficiency of the division by presenting our claims to the members of Congress "in season and out of season." Let them know that they represent the pomologists of this country as well as its politicians and tradesmen. We should not rest our faith in its usefulness upon the fact that the division is established; but with our valiant Commissioner Colman to set "the wedges," let us take turns at the maul, and drive them home in good Lincoln style. There is no telling what we may do if we only try, and try hard, and keep trying. As the Commissioner has seen fit to appoint one so young, and whose experience and knowledge are so far short of many of those whom he is addressing, I sincerely hope that all, and confidently trust that many, of the noble band of pomological workers will lend their aid, and not forget to exercise that brotherly forbearance with my faults which will be so often needed so long as I may occupy the position as Chief of the division. Indeed, the work can not be carried forward successfully except by your help and that of others. I now call upon any member of the American Horticultural Society to do in the future what he can for our common cause, and thank you most sincerely for what you have already done.

DISCUSSION ON MR. VAN DEMAN'S PAPER.

Mr. Ragan, of Indiana—When this new division was first talked of, I had my fears lest the Chief should be selected more on account of his political influence than through any special fitness he might have for the position. I had no fears of Commissioner Colman, but the tendency of the times is to push the politician to the front. I now feel that we have escaped, in this instance, and that a man has been selected from whom we can expect good work.

Mr. Reynolds, of New York—I confess that I am not so hopeful as some. We can not rely on the government, wholly, or in any great part, to carry on this work. The wonderful advancement made in horticulture in this country for the last thirty years, is mainly the result of individual efforts, assisted by voluntary socie-

ties. Do gentlemen believe the advance would have been more rapid had we been aided by the United States Government? We have not been entirely neglected by the general government. For many years there have been connected with the Department of Agriculture a division of Entomology and one of Botany. Prof. Riley has ably filled the former, and there has not a new insect, destructive of horticultural or agricultural products, appeared in any portion of the country, to which the attention of Prof. Riley has been called, but what he has investigated it, named it, described its appearance, history, mode of propagation, food products, preventives, remedies, etc., and the description, with illustrations and colored plates have appeared in the reports of the Department of Agriculture from year to year. Just so, the Botanist has examined all new plants, grains, vegetables and fruits, and descriptions and illustrations have been published in the reports. Yet, how many practical farmers and horticulturists have carefully read and preserved those reports? And how many of the class for which they would be designed would ever visit Washington and examine a cabinet of models of fruits? One of the purposes of the Department of Agriculture is the distribution of new, rare seeds among farmers and horticulturists. This operation has been mercilessly ridiculed by the press, and yet we are informed that the present Commissioner has no intention of discontinuing it. Now we will suggest a way by which this expenditure may be made valuable to those for whom it is ostensibly intended: Let the Commissioner expend the money appropriated for seeds, in purchasing really new and rare seeds that have a promise of value, and see that they are distributed among those who will probably make good use of them; not expend it in purchasing of seedsmen stale lots of old seeds that gardeners have grown for years, many of which they have long since discarded.

Mr. Cook, of Michigan—We want practical facts. In case of the insects we want the remedy, rather than so much of the scientific history and description.

President Earle, of Illinois—There is no more useful department of our National Government than the division of entomology under its thoroughly competent and efficient chief, Dr. Riley. I see no reason why similar good results may not come from a

division of pomology. The step taken by Commissioner Colman, in establishing this bureau, is only a beginning. The fruit-growing interests of this country should not be satisfied, however, with the services of one man, and he restricted to an appropriation of only $3,000. There should be a hundred good men in the service of this new division. There should be good men to look after all departments of horticulture and pomology; to hunt up and test new varieties from all quarters of the globe. We should not be content with this mere beginning, but should demand all that our great interest deserves to place it in the front rank of rural industries.

Mr. Hubbard, of New York—We should coöperate with the department, but we really do not. Questions were sent out in regard to the use of sulphate of copper as a remedy for mildew in grapes, yet but little attention was given them.

President Earle—The Government, through a division of pomology, should take up and energetically prosecute the good work so well begun by Prof. Budd and Mr. Gibb. We should thoroughly search Russia and the East for varieties adapted to our fickle climate.

Prof. Lazenby, of Ohio—Has Mr. Leo Weltz made any report of his recent trip to Russia in search of new varieties?

Mr. Van Deman—I do not think that he has. His mission seems to have been mainly of a private character, though having something of the authority of the Government.

Mr. Caywood, of New York—We can not expect a man to visit Russia at his private expense, and then give to the public the results of his labors.

Mr. Campbell, of Ohio, presented the following resolution, which was unanimously adopted:

Resolved, That this Society very cordially indorses the efficient action of the Commissioner of Agriculture, Colonel Norman J. Colman, in his depar ment, and especially for his recognition and encouragement of this and kindred Societies in their work, and especially by the appointment of one of our men.bers at the head of the Bureau of Pomology, and that we recommend, in addition to the work already performed, that some more practical methods be inaugurated for procuring and distributing of fruit reports for the

benefit of the fruit growers of the whole country, and that a more adequate and liberal appropriation be made to meet the proper wants of the department in this direction.

Mr. Myrick, of Massachusetts, agricultural editor of the *Farm and Home*, and *New England Homestead*, was then introduced, who read the following paper:

THE PRESS AND HORTICULTURE.

BY HERBERT MYRICK, OF MASSACHUSETTS.

That horticulture owes a large share of its progress to the brains and the persevering labor of its early and present followers, no intelligent person will deny. And these very men who have done so much for it, will not detract from the great work done by the press of America in behalf of horticulture. The one is a worthy supplement of the other, and that each appreciates the other's services is best shown by the very cordial co-operation and good feeling existing between our horticulturists and the press. The large and increasing number of agricultural and rural publications annually give more and more attention to horticulture. The number of strictly horticultural papers is also increasing. All this is the best possible evidence of the development of horticulture, and these journals aim to print matters of the greatest interest and profit to their readers. They present the experience of years in the fruit garden, orchard and vineyard, in such a way that the amateur and the inexperienced can not fail to take an active interest in horticulture. The press thus indirectly creates a demand for fruits and flowers, and then makes money for itself by honorably catering to that demand. The greater the development of horticulture, the happier and more healthy is the public; a love of the beautiful and a better citizenship results.

The press has done much to encourage fruit growing, but still there are thousands of farms and homes where a plentiful supply of fruit is unknown. Therefore there is still a great work to be done in this direction. But it is equally apparent that the press has been giving its attention almost exclusively to encouraging the production of fruits, while the marketing of horticultural products has been quite neglected. The result is that complaints of over-production and unremunerative prices are becoming more numerous. As a matter of fact, there is often as much in the selling as in the raising of fruits. Hence the press may well devote more attention to the *business end* of horticulture. The space between producer and consumer is too wide. It costs too much to bridge it. The expenses and labor of selling are frequently out of all proportion to the cost and work of production. The middlemen, who only handle the fruits, may make more money on them than does the producer. The fruit grower wants the press to aid him in co-operative selling. The Delaware Fruit Exchange affords a striking

instance of what may be done in this way. The principle upon which the co-operative butter factories of New England are so successfully operated may also be adapted to fruit growing sections. The planters may form a stock company on a small scale, put up a cold storage house, and in connection with it have a fruit evaporator, cider mill, jelly and jam works, etc. Here the surplus crop of perishable fruits may be worked up with the least expense and held until a favorable market presents itself, instead of adding to the supply of a glutted market and still further depressing prices. The longer-keeping fruits may be put in cold storage, and being in charge of one man, whose duty it is to attend to the marketing, may be realized upon immediately as opportunity presents itself. The press may also use its energies for opening up new markets in this and other countries.

Fruit crop reporting has been almost ignored by the press in many States, though it is of surpassing importance to the fruit grower. It is a work of years, however, to complete a system of obtaining reliable reports on fruits or other special crops which shall show the condition of such crops wherever grown. The report must be thus complete, because sources of supply are so large and transportation so rapid that a shortage in any locality is made up by an abundance in another. So great is the value of these special and general crop reports, that some of the Western States, notably Wisconsin, Indiana and Illinois, have devised a very practical method, that should be adopted in all the States, with the modifications necessary to adapt it to local wants. Michigan claims the honor of having originated this system. The plan is well outlined in the following extract from the revised statutes of Wisconsin:

"SEC. 1010. It shall be the duty of the assessors of each town in this State, at the time of making the annual assessment of property, to collect statistics in relation to the principal farm products of this State as follows, to wit: of wheat, corn, oats, barley, rye, potatoes, root crops and cranberries, the number of acres devoted to the cultivation of each respectively, for the current year, and also the number of bushels of each respectively raised in the preceding year; of apples, the number of acres in orchard, the number of trees of bearing age the current year, and also the number of bushels raised the preceding year; of flax, hops and tobacco, the number of acres the current year, the number of pounds raised the preceding year; of cultivated grasses, the number of acres the current year, the number of tons raised the preceding year; of growing timber, the number of acres; of milch cows, the number and value; of butter and cheese, the number of pounds manufactured of each the preceding year; of clover and timothy, the number of acres of each harvested for seed the preceding year, and the number of bushels of each obtained therefrom. And said assessor shall make duplicate certificates of such statistics, one of which he shall file in the office of the town clerk of his town, and the other with the clerk of the board of supervisors of his county, on or before the first day of July of the same year. The county clerk shall, on or before the fifteenth day of July in each year, forward to the Secretary of State, to be kept in his office, a certificate of the aggregate number of acres and the amount of yield of each of said products in his county, as ascertained and compiled from the certificates of said assessors."

This practically amounts to an annual census of farm products, and with the acreage report for the current year makes possible an accuracy in crop reporting that is of inestimable value. The beauty of the idea is that it involves comparatively no extra expense to the State, as the work is all done by the assessors and other officials already provided for. The press and the horticultural and agricultural organizations should take hold of this matter in earnest and secure the adoption of the plan in each State. Then in a few years crop reporting would be reduced to a science, and fruit growers would derive as much benefit from it as do the growers and dealers in the great grain and cotton staples.

If the press had done its full duty to our horticulture, Congress would ere this have passed the Hatch bill, for the establishment of agricultural experiment stations in each State. This bill appropriates $15,000 annually to each State for the support of an agricultural experiment station in connection with its agricultural college. It is provided that in a general way these stations shall be under the supervision of the Department of Agriculture. Their work is described; extensive investigations in horticulture and in forestry being among the prominent objects sought. The bill is open to criticism in detail, but in principle it is pregnant with more potent and far-reaching influences for the promotion of our agriculture and horticulture than any agricultural measure considered by Congress since the Morrill-Agricultural College act of 1862, the Oleomargarine bill not excepted. This bill was reached in the Senate last July, but was laid over until the next session. Considering its vast importance, the press and the farmers have been singularly silent regarding it, with one or two exceptions. The American Horticultural Society may well memorialize Congress in behalf of the measure, and thus call it to the attention of the press.*

Many papers refuse to notice new fruits of merit or patented novelties of almost indescribably practical value for fear of giving free advertising. The *Pacific Rural Press* is an honorable exception. It printed a full report of a horticultural society's discussion of the Perfect Fruit Carrier, in consequence of which this carrier has come into extensive use in that State, enabling its fruit growers to market their goods in better shape than ever before. The *Press* thus did its readers a great benefit, though it got only a picayunish advertisement from the manufacturers.

There is much prejudice against an increasing class of publications issued by nurserymen or dealers. But they do good. They go largely to a class who do not read the regular agricultural papers, and encourage this class to plant fruits. Such papers are, of course, largely advertising mediums for

---

* It is needless to say that the Society fully indorsed the effort to secure the passage of the bill referred to, as the subject of experiment stations has at all times engaged the most earnest attention, not only of its members, but also of the organization itself. The published records of the Society bear abundant evidence of this fact, and now, as the bill referred to has become a law, the Secretary takes great pleasure in here reproducing the same, in further proof of its hearty approval and good will. (See next page.) SECRETARY.

their proprietors, but so long as it appears that they are published by a dealer, the reader can make his own allowance regarding the statements they may make about varieties in which the proprietor is interested. But a horticultural journal run by a nursery under another name is a fraud.

Conceding what the press has done and what it may do for horticulture, we are now to consider what horticulturists can do for the press.

1. Horticulturists should write more freely for the press. A small per cent. of the more public-spirited fruit growers—such men as appreciate the value of this convention sufficiently to attend it and to support its organization—do their duty in this regard, but the horticultural writers of the country are few in comparison with the great number of men engaged in fruit growing. What editors want is a statement of your own practical experience, stated briefly. Criticism of what may appear on these subjects is also usually welcome, if fairly stated.

2. Judicious contributions to the local press will greatly promote the interest in local horticultural societies. But if the papers print such announcements free of charge, it is only a matter of courtesy to furnish them with a report of the society's meetings. The press affords the easiest way of working up and maintaining the utmost interest in local societies.

3. Horticultural society managers should remember that their work is to disseminate knowledge. The greater the facility that can be given the press to report the papers and discussions, the more good will the society accomplish and the greater will be the demand for its annual volumes of reports. The idea formerly prevailed that if the essays appeared for the first time in the annual report, the volume would be more sought after, and the managers regarded it as a sort of crime if the papers were reported in the horticultural press.

4. In writing for the press, I may repeat the time-honored injunction to "write on but one side of the paper," to which may be added, "write legibly, especially names and technical terms, and leave twice the usual space between the lines for convenience of the editor in revising."

FULL TEXT OF THE EXPERIMENT STATION BILL AS ENACTED BY CONGRESS AND APPROVED BY THE PRESIDENT MARCH 3, 1887.

An act to establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July 2, 1862, and of the acts supplementary thereto.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established, under direction of the college or colleges, or agricultural department of colleges, in each State or Territory established, or which may hereafter be established, in accordance

with the provisions of an act approved July 2, 1862, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to said act, a department to be known and designated as an "agricultural experiment station:" *Provided*, That in any State or Territory in which two such colleges have been or may be so established, the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the Legislature of such State or Territory shall otherwise direct.

SEC. 2. That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of food of the different kinds for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States or Territories.

SEC. 3. That, in order to secure, as far as practicable, uniformity of methods and results in the work of said stations, it shall be the duty of the United States Commissioner of Agriculture to furnish forms, as far as practicable, for the tabulation of results of investigation or experiments; to indicate, from time to time, such lines of inquiry as to him shall seem most important; and, in general, to furnish such advice and assistance as will best promote the purposes of this act. It shall be the duty of each of said stations, annually, on or before the first day of February, to make to the Governor of the State or Territory in which it is located, a full and detailed report of its operations, including a statement of receipts and expenditures, a copy of which report shall be sent to each of said stations, to the said Commissioner of Agriculture, and to the Secretary of the Treasury of the United States.

SEC. 4. That bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States or Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit. Such bulletins or reports, and the annual reports of said stations, shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster-General may from time to time prescribe.

SEC. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore prescribed, the sum of $15,000 is hereby appropriated to each State, to be specially provided for by Congress in the appropriations from year to year, and to each Territory entitled under the provisions of section 8 of this act, out of any money in the treasury proceeding from the sales of public lands, to be paid in equal quarterly payments on the first day of January, April, July and October in each year, to the treasurer or other officer duly appointed by the governing boards of said colleges to receive the same, the first payment to be made on the first day of October, 1887: *Provided, however*, That out of the first annual appropriation so received by any station

an amount not exceeding one-fifth may be expended in the erection, enlargement, or repair of a building or buildings necessary for carrying on the work of such station; and thereafter an amount not exceeding five per centum of such annual appropriation may be so expended.

SEC. 6. That whenever it shall appear to the Secretary of the Treasury, from the annual statement of receipts and expenditures of any of said stations that a portion of the preceding annual appropriation remains unexpended, such amount shall be deducted from the next succeeding annual appropriation to such station, in order that the amount of money appropriated to any station shall not exceed the amount actually and necessarily required for its maintenance and support.

SEC. 7. That nothing in this act shall be construed to impair or modify the legal relation existing between any of the said colleges and the government of the States or Territories in which they are respectively located.

SEC. 8. That in States having colleges entitled under this section to the benefits of this act, and having also agricultural experiment stations established by the law separate from said colleges, such States shall be authorized to apply such benefits to experiments at stations so established by such States; and in case any State shall have established, under the provisions of said act of July 2 aforesaid, an agricultural department or experimental station in connection with any university, college, or institution not distinctively an agricultural college or school, and such State shall have established or shall hereafter establish a separate agricultural college or school, which shall have connected therewith an experimental farm or station, the Legislature of such State may apply in whole or part the appropriation by this act made, to such separate agricultural college or school; and no Legislature shall, by contract, express or implied, disable itself from so doing.

SEC. 9. That the grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purpose of said grants: *Provided*, That payments of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of its Legislature meeting next after the passage of this act shall be made upon the assent of the Governor thereof, duly certified to the Secretary of the Treasury.

SEC. 10. Nothing in this act shall be held or construed as binding the United States to continue any payments from the treasury to any or all the States or institutions mentioned in this act, but Congress may at any time amend, suspend or repeal any or all of the provisions of this act.

On motion, the Society adjourned.

Third Day—Thursday.

AFTERNOON SESSION.

At 2 o'clock the Society was again called to order.

President Earle referred with regret to the absence of Commissioner Colman from the meeting, which was the more painful since

he was detained by the recent death of his mother and the sickness of Mrs. C. He also introduced the paper of Captain G. Doppelmair, of Kiev, Russia, but as it had not been translated it could not be read.

NOTE.—The Secretary has since had the paper translated, through the kindness of Mr. Tuisco Greiner, of New Jersey, which is here presented.

THE PROTECTION OF RAILWAY TRACKS FROM SNOW-DRIFTS.

BY G. DOPPELMAIR, OF RUSSIA.

Mr. President and Members of the American Horticultural Society:

Your respected Secretary has kindly invited me to attend your annual meeting at Cleveland, Ohio, or at least to send you an essay. I regret that circumstances have not permitted me to meet with you on this occasion. Being compelled to forego the pleasure of addressing you personally, I shall also miss the opportunity of gathering knowledge in the company of men so prominent in American horticulture.

I hope to live to see the day when I shall be allowed to visit America once more, and to tell you orally of my great esteem for you. This time I can only send you my respects on paper across the ocean, expressing in this manner my interest in and my sympathies with the great aims which you pursue.

In regard to our friend Ragan's request that I should address this Society, I will freely confess that it has caused me considerable perplexity. Not even the expert, much less one who, like me, is only an amateur, will find it an easy task—as you will admit—to tell anything new and instructive to an American Society which is foremost in all horticultural questions, and composed of so eminent members. I have informed your Secretary of my scruples, and we have attempted to find a way of escape out of this dilemma in the following manner:

People generally connect in their minds the name "Russia" with the idea of frost and snow. In conformity with this tradition, I come before you with a paper which will tell of snow; but it is not intended to make you shiver from frost, and chill your hearts, but to warm your horticultural sentiments, as it shall treat on *planting trees;* planting trees *en masse* in deserted, treeless prairies, such as we find in America as well as in Russia; where the eye, for miles and miles, roves only over waving grain and grass, without the chance of resting once upon a single group of trees. To create thrifty trees in a desert of this kind, as if by magic, is an achievement which you, being acquainted with the difficulties of such plantations, undoubtedly will know how to appreciate. Being told by Mr. Ragan that your railroads

through the prairies have much to suffer from snow-storms every winter, and supposing that many of you know by personal experience to what extent the traffic can be obstructed by drifts, I flatter myself that you will bid welcome to an address on this important subject.

South Russia, especially the southeastern portion, is frequently visited by snow-storms, which are liable to become dangerous to man and beast, to render the track impassable for days at a time, and cause a very large expense to the railroad companies. These snow-storms occur most frequently in the second half of the winter, generally accompanied by considerable wind. A velocity of only ten meters per second, according to the observations of civil engineer Savelieff, is sufficient to make the wind load itself with and carry along this dry snow, and to pile it up in drifts. No railroad sections suffer more from them than cuts which are not more that ten or twelve feet deep, embankments which are not higher than three or four feet, and all parts which are on a level with the surrounding ground. To protect such sections against snow-drifts, hurdles, made of shingles, boards, old ties, etc., have been placed at a certain distance from the rails. Hurdles woven net fashion, with openings which constitute 40 to 50 per cent. of the aggre gate surface, have proved best, as they require comparatively little material, do not resist the force of the wind more than needed (being open), and can easily be shifted after a heavy storm and placed upon the drift having formed in front of them, to do service during the next snow-storm. Since the sections subject to obstruction by snow-drifts form a large part of the railway beds, it is obvious that the provision and maintenance of these hurdle snow-breaks require an immense outlay of money, especially if it is considered that timber in these treeless steppes is quite costly, not to speak of the labor required in putting up these hurdles and in frequently shifting them.

Wishing to substitute a permanent protection for this temporary and expensive one, the railroad companies tried planting a row of trees along the endangered sections. These first attempts, however, resulted in failure, as a natural consequence of neglect to give the proper care and protection, as well as of want of rational and skillful management in the establishment of such plantations. It soon became apparent that a single row of trees does not break the force of the wind sufficiently to make it drop its load of snow, as the hurdles did, and that the snow will be forced past the trunks and left upon the track. So the scheme was abandoned. It was not until after 1870 that Mr. N. K. Sredinsky succeeded, by means of experiments, close observation and rational methods, in finding a favorable solution of this question. For many years a model forestry station had been engaged in the work of conducting experiments in planting forests under the unfavorable conditions met with in the steppes, with a view of turning the experience gathered to practical use in the creation of forests in the treeless regions.

THIS FORESTRY STATION,

Known under the name of Velikoanadolskoe, was established about forty years ago, and is situated in the circuit Alexandrow and government of Ekoternoslow. Under the directorship of the scholarly and energetic Chief Forestmaster Van Graff the institution has accomplished the task assigned to it in a most creditable manner, as may be seen by the following words quoted from a report of Mr. M. Tursky, who visited the station in 1884: "One must have been on the spot, one must have seen with one's own eyes the forest of Velikoanadolskoe, in order to fully comprehend what noble achievement has been reached here by the transformation of the desert into forest. Language is unable to describe the gratifying sensation which this oasis in the unlimited steppe calls forth in the visitor. Forests more than three thousand acres in extent, many of them covered with trees forty years old; a park of one hundred acres, with luxuriant vegetation, where not a tree grew forty years ago—these are living examples of the results which can be obtained by knowledge and labor." Van Graff's success is owing chiefly to rational handling and culture of the seedlings, to development of their roots to their fullest capacity, and to care in providing moisture after planting by keeping the plantation free from weeds and the soil finely pulverized; also, to the selection of suitable tree sorts, and to the observation of such distances in planting them as will tend to cover the ground as soon as possible, and thus keep the soil shaded and porous.

The following tree sorts were successfully used in the establishment of these forests: *Ulmus effusa, Ulmus suberosa, Ulmus Montana, Acer plantanoides, Fraxinus excelsior, Robinia pseudacacia, Acer Tartaricum,* and others of less importance. It became apparent that pure maple and ash plantations are too loose, and do not thrive near so well as when planted among *Ulmus suberosa,* which, with its denser and more spreading branches, shades the soil much sooner than even *Ulmus effusa,* which has the tendency to grow more in height than in width. According to Mr. Tursky's report, the crowns of the trees in such mixed plantations touch when seven years from planting, and the soil among the trees is quite loose and porous, though free from vegetation. During the lapse of fifteen or twenty years the soil becomes still more porous by the accumulation of humus, and in twenty-five to thirty years we find a beautiful undergrowth of man's height. This is a new generation, ready to take up the fight against the desert when the tall growth is cut down.

An area of about three hundred acres was also devoted to experiments with the culture of *Robinia pseudacacia.* This, however, is abandoned, since the white [Yellow?—TRANS.] locust grows rapidly and thrifty in that section only during the first five to eight years, but afterward suffers injury from frost, causing vacant spots, so that the ground is not kept sufficiently shaded, hence becomes sodded over and hard, like the steppe. For this reason the locust is not considered valuable for these purposes in South Russia. I, for my part, however, believe that it is hardly just to condemn

the locust in this manner, for the complaints against it have a truthful foundation only at the southeast, where it is subject to injury from freezing. Where this is not the case, as, for instance, at the southwest of Russia, the locust must prove to be next to indispensable for the prairie, on account of its luxuriant growth, early shading of the ground, vitality of its roots, and adaptability to the driest soil. As a snow-break, however, it has one bad feature: tne limbs are liable to break in the forks under the weight of the snow; yet this does not detract from its value as a shade-providing undergrowth for mixed culture in the prairies. Mr. Tikhanoff has also done a meritorious work in the circuit Mins, of the same government, by the establishment of plantations in the prairies along the Donety railroad where it crosses the country of the Cossacks. His plantations, established in 1872, covered in 1884 an area of two thousand two hundred and fifty acres. Four hundred acres are planted every year. His success is due to rational, judicious management. Mr. Meier and Mr. Kornis likewise deserve credit for their successful plantations in the steppes.

The experience gathered in Velikoanadolskoe, and by the mentioned pioneers in prairie forestry, convinced Mr. Sredinsky, who had kept the plan of protecting railroad tracks against snow-drifts in view, that the growth and preservation of the seedlings can be secured by planting several rows of them, and that these in time will serve as an obstruction sufficient to prevent the drift snow from reaching the track. To make success still more complete, Mr. Sredinsky made up his mind to plant standard trees in the inner rows, and shrubbery or trees which are suitable for hedges in the outer rows. The plantations arranged in this fashion along the Kharkoff-Rostow and other railroads met the inventor's anticipations so perfectly that his achievements were awarded the gold medal at the exhibition in Kharkoff.

By special grants, a strip of territory extending about seventy feet on each side of the railroad tracks has become the property of the companies. This property is known as the "reserves." Next to the line, on each side, Mr. Sredinsky planted seven rows of trees parallel with the track. The rows are four and one half feet apart, and the seedlings in the inner rows, which are standard trees, two and one-third feet; those in the outer rows, which are shrubs or low-growing trees, one and one-fourth feet apart. In this manner a strip of forest is obtained, with a handsome dome in the center and a solid wall of branches clear from the ground (the result of proper pruning of the outer rows). The force and velocity of the wind which drives the snow is broken by this living wall, and the snow dropped among the rows and a little beyond, but without reaching the track. These snow-breakers have proved so serviceable that the railroads at the south have mostly abandoned their former method and resorted to these forest plantations.

The Southwest Railroad, which connects Kiev and Odessa, four years ago also began planting these strips of forest along their southern and eastern sections so far as they intersect the steppes of New Russia. Their efforts

were awarded the silver medal at the forestry exhibition in Moscow last year. Having taken part, as expert adviser, in the organization of these plantations (which were designed by Mr. Alekhin, the chief engineer of the Southwest Railroad, and executed by two expert gardeners, the Messrs Elsasser and Kaptschiusky), I am in the situation to make you acquainted with all the details. Before attempting to describe the method of planting I will premise the following data about the geographical position and the climate of the country, in order to show you clearly the difficulties which were to be surmounted: The southern part of the Southwest Railroad runs through a country which has only forty (at Odessa) to forty-five (at Elizabethgrad) centimeters of annual rainfall, with an average temperature of 27° F. in January, 46.76° in April, 59° in May, 72° in July, 61.2° in September, and 49° F. during the whole year. Denver, Col., U. S. A. (under 39½° north latitude), has approximately the same climatic conditions, if we believe the tables contained in the excellent work, "The Climate of the Terrestrial Globe," by Vojejkoff.

The annual rainfall along the mentioned part of the Southwest Railroad is distributed over the different months as follows, viz.:

January	5 per cent.	July	12 per cent.
February	5 per cent.	August	8 per cent.
March	7 per cent.	September	8 per cent.
April	7 per cent.	October	8 per cent.
May	9 per cent.	November	10 per cent.
June	13 per cent.	December	8 per cent.

To make the unfavorable conditions of this region still more apparent, I call your attention to the following comparison between Iowa, U. S. A., and Odessa, Russia:

	Average Temperature.			Annual Rainfall.		
	For the year.	For May.	For July.	For the year.	April–June.	For July.
Iowa	47.5° F.	59.9° F.	73.9° F.	99 ctm.	31 ctm.	35 ctm.
Odessa	49.0° F.	59.0° F.	72.0° F.	40 ctm.	12 ctm.	11 ctm.

The direction of the wind is chiefly from northeast during January, February and March; from south and partly southwest during April and May; from north and northwest during July and August; while southwest winds become predominant in November and December. The amount of rainfall

in this region, according to the observations of Prof. Klassovsky, is extremely unfavorable, especially during the growing season, being as follows:

April	78.2 millim.	July	120.1 millim.
May	70.8 millim.	August	102.5 millim.
June	153.4 millim.	September	105.3 millim.

The average number of rainy days is 106, and the average rainfall of one day 4.1 mm.

In the face of so unfavorable conditions, the Southwest Railroad concluded to plant those living wind-breakers. Consequently, nurseries were established, first in Krijopol, and afterward in Rasdelnaga, the latter containing twenty-seven acres. These were divided into sections, and the sections into beds, in which, generally in autumn, the seeds were sown in rows about twenty centimeters apart. Seed of *Ulmus suberosa* and *U. effusa*, however, is always planted in the summer, shortly after the seed is gathered. Since seeds, as well as soil, are liable to be blown away by the heavy and dry winds so common in spring, the beds are mulched in autumn with straw, which is chopped about twenty centimeters long, and this affords the needed protection to the tiny plants against the winds and the scorching sun's rays. During the spring and summer following the mulch is removed, the seedlings thinned, the soil properly hoed and kept free from weeds. A system of pipes and hydrants supplies the nursery with water, and during the first years the beds were irrigated by means of hose adjusted to the hydrants whenever the drouth continued for some time. This method of irrigation, however, has been dispensed with in the two years just past, and thorough cultivation of the soil between the rows substituted for it. This is considered better suited to the purpose, which is to accustom the seedlings from the very start to the conditions of their future location. Many seedlings die under this treatment, but all those survive the roots of which are developed in such a manner that they can bid defiance to the drouth; hence, they promise to furnish good stock for the steppes. To increase the roots of these seedlings, and thereby their drouth-resisting qualities, the attempt has been made recently to root-prune them, shortening their roots about one-third by an oblique cut with a sharp knife, but without lifting them out of the ground or transplanting them, which, with so large a number of plants, would be a long and tedious task.

This root-pruning is done after the appearance of the second pair of leaves, and while the seedlings are yet soft and succulent, at a time when previous rains have nicely softened the ground. This treatment of the seedlings has proved to be sufficient for the local conditions here; for still more unfavorable conditions it might, possibly, be advisable to resort, after root-pruning, also to transplanting in autumn; or, instead of the summary treatment of root pruning while in the ground, to shorten the roots about one third after taking up the seedlings—as is done with fruit tree seedlings—and to reset them in the seedling beds, and transplant a second time in autumn.

Seedlings thus grown would develop such an apparatus of feeding roots that they could defy repeated and prolonged spells of severe drouth. Since success in transplanting and the absorption of the nutriment necessary for a strong growth are dependent on the amount and capacity of the roots, everything which might contribute to their development deserves the closest attention.

While ash, elm and maple do not become transplantable until the second year, *Robinia pseudacacia* grows already, by the fall of the first year, to the height of from one and one half to two and one-half feet. These yearling white [Yellow?—TRANS.] locusts and the other two-year old seedlings are carefully lifted out of the ground by means of the spade, in the fall, and sorted. The largest, after having one-third of their roots trimmed off, are "heeled in" in the nursery, a thousand in a bundle; those of medium size, after having their roots trimmed in the same manner, are planted again in the nursery; the smallest are thrown away. In March and April, after the ground has thawed out, the soil of the "reservations" to be planted is harrowed, and marked in rows at the proper distance. In the mean time, the seedlings which were "heeled in" are taken up, their roots dipped in thin mud, and the plants packed in boxes with convenient handles so that two men can carry them easily. They are then forwarded to the stations nearest to the respective places of planting, and distributed along the "reserves" as needed. The reserves belonging to the Southwest Railroad are not so wide, and five rows of trees here is the rule, while seven rows, as recommended by Mr. Sredinsky, are planted only in exceptional cases. The number of trees required for planting a verst (3,500 English feet) of single row is 3,000, or 15,000 for the five rows.

When the hands are ready the plants are "puddled" once more, one man then making a hole every one and one-fourth feet by means of a large dibble; a boy follows, throwing down one plant to each hole (or every other one, according to kind of tree), and another man sets the trees, working the soil firmly about the roots with a dibble. All five or seven rows are planted simultaneously, each by one set of hands. A woman follows after the planter in each row to inspect the work and call attention to faults in the operation. During the summer the weeds are subdued by the frequent use of cultivator and hand hoe, and the soil thus kept well pulverized. In spring following missing (dead) plants are replaced, and the soil worked as the year before. The same treatment is given the third season. The outer rows are trimmed from the start in the proper shape to form close hedges. A plantation of this kind of four years' growth, near the station Krijopol, has a height of from eight to twelve feet in the inner rows.

Concerning the tools used in all this work, I have to confess that they leave a great deal to desire. Cultivators and hoes are of old styles, and do not accomplish—either in quantity or in quality—what can be expected from modern implements. Much labor might be saved, and better work done, by the use of the Planet, Jr., seed drill and hand cultivator, or other im-

proved tools, both in the nurseries and in the plantations. The Southwest Railroad plants 100-135 versts (660 to 900 miles) of these five- and seven-rowed strips along the track annually.

Here, in a comparatively milder climate, the planter has a greater variety of trees from which to make his selection than in Velikoanadolskoe and along the southeast railways. The following are used: *Rob. pseudo-acacia, Ulmus suberosa, Ulmus effusa, Fraxinus excelsior, Acer plantanoides, Acer negundo, Gleditschia triacanthos, Elæagnus angustifolia, Caragana arborescens Hippophae rhamnoides, Prunus spinosa* and *Acer Tartaricum.* Especially valuable for these purposes have proved to be the elm sorts, white locust, *Gleditschia triac., Elæagnus angustifolia.*

The expenses of these plantations of five rows along the Southwest Railroad are in the neighborhood of $125 per verst (3,500 feet). An expensive pleasure! you will exclaim, and I say so, too. But with more experience and skill, and with better implements, these expenses will be greatly reduced. Still, the railroad companies can well afford to bear them as they are, for the former method of protection by hurdles, with the labor required every winter, was much more expensive than these living plantations after they are once established. Yet I look for still other good effects of these railroad plantations. The farmer with but little capital who has always looked upon the question of establishing forests in the steppes as one connected with insurmountable difficulties is taught literally *en passant*—in passing by—of his error, and this *demonstratio ad oculos*, most likely, will give him food for profitable reflection. It is to be hoped that the companies will not make the farmer pay for this advantage by means of an advance in the rates of railroad fares.

In regard to the expenses of these plantations, I will also quote Mr. Tursky's estimate: "The cost of planting a forest in Velikoanadolskoe amounts at present to $51 (formerly to $80) per destiatine (1 des.=0.915 hect.). Mr. Tikhanoff's expense, however, is as follows:

Plowing and harrowing	$5 00
Planting	3 50
Replanting in spring	25
Cultivating, hoeing, in the first year (five times)	6 35
Cultivating, hoeing, in the second year (three times)	5 91
Cultivating, hoeing, in the third year (two times)	3 40
Total	$24 41

The difference is large, but the cost is considerable in any case. Mr. Tursky thinks that the expenses can be greatly reduced by a more judicious management, and the figures of Mr. Tikhanoff, with his somewhat improved methods, show it. I am of the same opinion, and will add that better results might be reached by taking hold of this matter in an altogether different way. I believe that it is radically wrong to start forests on a large scale

right in the heart of the desert. The right method, in the attempt to cover the steppes with forests at the smallest possible expense, would be by beginning to plant along the edge of the timber region, and by extending them along the rivers and rills, and thus, under the protection of the moisture emanating from these water-courses, to enter the interior of the steppes and subdue them.

If the governments had made this principle the basis of their premiums and laws which have reference to timber culture and settlement in the prairies, it is more than probable that already, at the present day, large areas of barren lands which at present yield little or no revenue would be reclaimed for agricultural purposes, and much money might be saved which is now swallowed up in the fight against unfavorable conditions; not to speak of the disappointments, the annoyance and loss of valuable time which have been the result of many attempts to create forests in the midst of a barren desert. As an army moves upon the enemy's territory under the protection of cannon, so should the planter move upon the desert under the protection of a supply of moisture.

I fear, gentlemen, that I have already occupied your time and attention too long, and will close with the wish that my remarks may induce you to experiment in this field of timber culture along the railroads which intersect your prairies. With the abundant timber material which is at your disposal, with your improved implements, and with the energy and skill which characterize all your enterprises, the achievement of brilliant results in this direction can be only a question of time. Good luck!

MOHILEIV, RUSSIA, August 1–13, 1886.

COMPARATIVE GROWTH OF TREES

Was the subject of a verbal address by Prof. Lazenby, of the Ohio Experiment Station, of which the following is a brief synopsis:

Prof. Lazenby illustrated his lecture with specimens of various kinds of forest trees, grown from seed on the grounds of the experimental station. "Our State is divided into four agricultural divisions," said Prof. Lazenby, "one the grass and grain growing section, another small fruits, the third vegetables, and the fourth trees. There are few States where the area of forest is so small in comparison with the tilled land in Ohio. I desire this afternoon to discuss the comparative growth of trees. I have made experiments with a number of common trees. The seeds were sown in the spring of 1881. Our locust and catalpa trees are fast growers and make good wood to cultivate for profit. For fence posts and like uses the locust is much superior to the catalpa. I think that for profit the ash is one of our most promising and most thrifty trees. The rows of ash trees grew

with great regularity and stood crowding better than any other tree we have cultivated. There is a great demand for young ash as well as old ash. The soft or red maple grows more rapidly than the sugar maple, but I notice that the sugar maple grew well the third year. On the bottom lands of Ohio the chestnut will not grow naturally and hence can not be raised for profit. Our soil does not take kindly to it and our chestnut trees are dwarfed. I believe that the time has come for us to give more attention to the culture of trees. I urge this upon the ground that timber culture pays. I do not think we should gain much by calling for forests on account of the climate. Cultivate for the money that is in timber, and if the forests help the climate so much the better. If you have land you don't cultivate, utilize it for timber. Plant seeds in the winter and let healthy young trees take the place of unprofitable timber, that should be cut from the woodland. We should also make it a rule never to allow stock to enter woodland for pasturage. We should also guard, with more care, against fires. The loss by fire is not in the timber destroyed alone, but it unfits, to a degree, the land for the growth of trees in the future."

DISCUSSION ON FORESTRY.

Mr. Waugh, of Ohio—Soft maple seed ripen in May, and should be planted immediately. I have grown them to the height of two and a half feet the first year.

Secretary Ragan, of Indiana—I want to thank Prof. Lazenby for this interesting lecture, and only hope that he will put his remarks into writing, so that his lecture may be published in full.

Mr. Cushman, of Ohio—I set a gate-post of black locust in 1836, and in resetting it recently, found it comparatively sound. Would it not be well for us to memorialize our Legislature to protect our forests from wanton destruction? We have stock laws in our section of the State (Euclid), which saves us great expense in fencing against our neighbors' stock.

Prof. Lazenby—We should not be too sentimental about trees. We should grow them for use, and not with a view to greatly changing our climate thereby.

Dr. McKay, of Mississippi—The locust is the most durable and

profitable timber we can grow. There is a grove in my neighborhood that supplies a large section of country with posts.

President Earle—I do not like the channel that this discussion is drifting into. Individuals may grow trees for æsthetic and economical uses, but what I want to see is the States and General Government to take hold of this forestry question, and not only plant, but preserve, by the great strong arm of the law, forests that will bring back to us something of the conditions of climate that have been so rapidly and so wantonly sacrificed to the greedy avarice of the present and past generations. In the face of such warnings as come to us from older and now desolate regions, such as exist wherever man has forgotten his obligation to posterity, if not from the older settled portions of our own America, we should not lightly appreciate that sentiment which would spare the waste of the "woodman's ax." I may be ultra—I may be wrong, but when I reflect back to the day, within my own short memory, when almost all the fruits of a temperate climate flourished in the great Mississippi valley, and when a short fruit crop was the exception and not the rule, as now, I am led to the conclusion that much of this is due to climatic changes incident to the destruction of our primeval forests. We, as individuals, or even as a Society, can do but little towards arresting this dangerous destruction of our natural forests and towards restoring them by new plantations, beyond creating a *sentiment* which will tell through the action of our legal representatives in the National and State halls of legislation. If we are slow to read the warning, we need only to consider the present conditions of extremes; extreme drouths or of floods; extremes of heat and of sudden cold; of rushing destructive torrents and burning sands. We may thus picture to ourselves a future condition similar to that now existing in Palestine and Arabia. Let us help save this fair land of ours from such a fate.

Mr. S. D. Hillman was then introduced and read the following paper:

FRUIT GROWING IN THE NORTHWEST.

BY J. S. HARRIS, OF MINNESOTA.

The duties devolving upon me as a member of the State Board of Agriculture of Minnesota, and the fatigue I feel from the laborious work attend-

ant upon our State Fair, just closed, lead me to regret that I have promised a paper for this occasion, and will deprive me of the pleasure of meeting with you.

I can not give you a carefully prepared paper upon the subject your Secretary has assigned to me. The Northwest has gradually receded before the march of civilization until it is now known as the region embraced in the States of Wisconsin, Minnesota, Northern Iowa, Dakota and Montana; but it is still an empire in extent, the fairest land the sun shines upon, and there is no other section of this great country that to-day offers such unsurpassed inducements to the farmer, mechanic, merchant, professional man, and all others seeking new homes to come and settle within her borders. The climate is stimulating and well calculated to bring men and animals to their greatest state of perfection. The waters are as pure and as abundant as in any inhabited country upon the globe. The soil is unequaled in variety, fertility and natural adaptation to the growing, in its greatest perfection, of almost every fruit, vegetable and cereal required for the sustenance of civilized man, and it possesses a purity of atmosphere that promotes health and vigor to man and the products of the soil. Within its borders are found forests of valuable timber, vast prairies ready for the plow of the husbandman, and deposits of the richest minerals. These peculiar advantages have brought within its borders a pioneer people, composed of the most intelligent and progressive, from every land, and the development of its resources are marvelous. A history of its horticulture, which is trying to keep pace with other industries, would read like a romance, and tell of struggles and trials, failures and triumphs of men who had nerve and hope enough to enable them to plant trees in opposition to public opinion and in the face of the difficulties attendant upon the settlement of a new country, and in many instances where the results were only disastrous. Fortunately, a few of these early pioneers, scattered here and there, were of this class of men, and they have persisted in planting trees, making experiments and hanging on to a forlorn hope until they have gained the confidence of the multitudes and are now regarded as heroes in horticulture.

THE PAST OF HORTICULTURE.

The first planting of trees and fruits by the early settlers of this country was of such varieties as were favorites in their former homes. The planters had but an imperfect knowledge of the soil and climate of the country and the hardiness and adaptability of varieties. For a few years a great number of varieties succeeded so well as to raise fond hopes that this was destined to be a country well adapted to the production of apples, pears and all hardy fruits, and orchards were being extensively planted with the most tender varieties. Right upon this hopeful period occurred a fearful disaster. The winter of 1872-3 destroyed trees by thousands and totally annihilated hundreds of orchards of the old favorite varieties. Investigation proved the cause to be root-killing, resulting from a severe and protracted drouth which

had prevailed in the fall. The ground froze up dry, and the absence of snow caused it to freeze to a great depth, consequently all moisture was drawn from the roots. A few varieties survived this test (one not likely to come again in an ordinary lifetime) and they were considered to be "iron-clads" and formed the basis of replanting and starting new orchards. Ten or twelve years of remarkable success followed this great disaster, and a new impetus was given to the planting of such varieties as had survived the severe test, and in looking about for others of equal hardiness, and to the originating of new varieties from seed, when in the winter of 1884-5 a disaster as great as the first overtook us. The conditions of the latter were in many respects directly opposite the first. A summer drouth and early frost had matured the growth of the trees. September, October and half of November was wet and very warm, starting a new growth. Winter shut down suddenly, was long and severe, and deep snows prevented freezing of the ground. The opening of spring found the tops and trunks of many varieties killed to the ground.

THE PRESENT.

Not yet discouraged, our people are turning past failures to profit. Improved varieties of the Siberians, several varieties of home seedlings, and many varieties of Russian origin stood this severe test with little or no injury, and there has been no time in the past when more interest has been manifested in fruit growing. Our horticultural societies are gaining in strength and usefulness. Our orchards are being reset and extended; but only such varieties are being used as have proven to be early and abundant bearers and reasonably hardy, while extensive experiments are being made with newer varieties imported from Russia and in the originating of new varieties. At the Minnesota State Fair, just held, the horticultural display was one of the best ever made in the Northwest. It included nearly one hundred varieties of large and fine apples, several improved Siberians, a few new seedlings, some thirty varieties of the best American grapes, and several of native plums.

THE FUTURE IS HOPEFUL.

There is not a reasonable doubt but that some of the varieties recently introduced from Russia, by Messrs. Budd, of Iowa, and Gibb, of Canada, will prove adapted to all parts of this great country, and it is believed that seedlings from them, developed in our soil and climate, will be adapted to our wants and produce fruits of great excellence, which, together with the improvement being made in the Siberian species by Peter M. Gideon (the originator of the Wealthy apple), by crossing and hybridizing with the larger apple, will soon give us an enviable reputation as an apple-producing region, and that we shall have a race of apples that shall be perfectly adapted to this region and meet every want of the teeming millions who will in the near future people this magnificent country.

The difficulties in the way of growing other fruits have been more easily overcome, and to-day the Northwest has a good reputation for the abundance of its strawberries, raspberries and grapes. The strawberry is at home here, and is largely grown for home use and for market. The most popular varieties are Wilson, Crescent, Downer and Glendale. These are usually grown in matted rows, and the beds continued from two to three years. Marketing is chiefly done in quart boxes, shipped in sixteen and twenty-four quart crates. Prices range from five to fifteen cents per quart, according to season and quality.

The varieties of raspberries most extensively cultivated are Doolittle and Seneca for blackcaps, and Turner, Philadelphia and Cuthbert for reds. Some winter protection is usually given. The yield is generally abundant and the crop sure. When winter protection is given, blackberries are found to do well and are a very profitable crop. The varieties are Snyder and Ancient Briton. Currants and gooseberries are at home here. The cultivation of native grapes is now attracting considerable attention, and all varieties that will ripen early enough to escape the autumn frosts produce the most perfect fruit that can be found in the Union. The varieties most extensively grown are Concord, Delaware and Worden. Many others are doing equally well, and the future of grape culture is very promising.

Among the fruits indigenous to this region, there is none giving a promise of greater possibilities than the Canada plum (*Prunus Americana*). Several varieties, as the Desota, Rolling Stone, Cheney, Forest Garden and Weaver, have taken their places among our popular fruits, and steps are being taken to ameliorate and improve them by cultivation and selection of seedlings. Floriculture is receiving its share of attention, and the displays of flowers and plants at our State and other fairs could hardly be excelled by those of the older States. No country in the world, of like extent, surpasses this in the quality and quantity of its vegetables, with which all our markets are abundantly supplied.

DISCUSSION ON MR. HARRIS' PAPER.

President Earle—We have in this paper one of interest to us. The possible success of fruit-growing in the Northwest was, but a few years since, very doubtful. That the energetic people of that region have overcome the great natural difficulties that stood in the way of success is, indeed, a matter of satisfaction and interest to us.

Mr. Green, of New York—We have in this paper a strong argument against the advice of Mr. Hale, read in our hearing yesterday, to new beginners "not to begin" the business of fruit-growing. We are assured by Mr. Harris that men have not only *begun*, but that they have succeeded, under most trying circumstances. The

business of fruit-growing is not yet overdone. There are hundreds and thousands of acres of hill lands in Virginia and the South worthless for ordinary farming, but well adapted to small fruit growing, and yet the people of those regions are almost strangers to the luxury of good fruit. No person with even a small village lot should be without grapes. They may be trained to the division fences, or upon the walls of buildings.

Mr. Ohmer, of Ohio—A son of mine, in Minnesota, raises his own berries. The Reliance and Turner raspberries do well there if protected by snow, or, which is more certain and reliable, if they are laid down in the fall and covered with earth.

Mr. Smith, of Wisconsin—I cover my raspberries with earth on the tips, to hold them down, and the remainder with marsh hay. Strawberries do better with us than further south, as they are sure of winter protection in our abundant snows. We prune our grape-vines in the fall, and lay them down, with a slight covering. We are then sure of a crop of fruit.

Mr. Campbell, of Ohio, then read a paper as follows:

THE ADVANTAGES OF BETTER CULTURE OF GRAPE-VINES.

BY GEO. W. CAMPBELL, OF OHIO.

I presume there is no man who has been growing and caring for grape-vines for more than forty years, as I have, who has not discovered that his success in growing grapes was generally just in proportion to the care intelligently given to the vines; and it may also have been discovered that, with a little *extra* care, the finer and more valuable varieties of grapes can be grown quite as successfully as the more common and inferior ones.

Many persons say they do not want grapes that require extra care or protection. All such, except in the most favored localities, must depend upon, and be content with, the hardier and comparatively inferior kinds; for, with grapes, as well as other fruits, the finest quality is usually accompanied with more or less tenderness in the constitution and growth of the vines or trees. And, although it now seems probable that this difficulty may be lessened, or perhaps overcome, by means of the crossing of different varieties and raising new seedlings therefrom, the principle will still remain that the better culture will give the best and most profitable results.

Man was originally placed in a garden, and the command to "dress it and keep it" was not without significance; and from that day to this the earth yields her richest returns only to the orchardist, the gardener or the vine-

yardist who "dresses and keeps" his trees, plants and vines most faithfully. There are few things in this world that are worth having which can be produced without care or labor. To illustrate my ideas as to the advantages of better culture of grape-vines a little of my own experience will be given, the inferences from which will not be difficult.

More than thirty years ago I planted a Delaware vine—then a famous novelty. With good care, the third year after planting it made nine canes or shoots from ten to twelve feet in length. During the season of growth the laterals were pinched off, and the canes carefully tied up, fan-shaped, and at about equal distances apart, upon a wall near which they grew. The following season four of these canes were pruned out, and the five remaining shortened from one-third to one-fourth of their length. Upon the shoots from these canes appeared, in the spring, about three hundred clusters. Two hundred of them were immediately cut off, soon after blossoming, including, of course, all the smaller or inferior bunches. Four new shoots were trained up for the next year's fruiting from the base of the four which had been pruned out. The fruit-bearing shoots were pinched off at about two feet in length, beginning with the upper ones which started first and most vigorously. They were kept nearly equalized the whole season, the whole strength of the vine being thus directed to the maturity of the fruit and the growing of the four new canes for the next year's bearing. The result was the perfect ripening of one hundred clusters of as fine Delaware grapes as I have ever grown, and the perfect maturity of the wood of the four canes for future bearing. Some of the clusters of that crop of grapes were sent to the Massachusetts Horticultural Society, and received the award of a silver medal. Others were sent to the editor of the *Gardeners' Monthly* at Philadelphia, and were regarded as worthy of being perpetuated by a handsome colored plate in that magazine. Now, what would have been the result of careless or no culture in this instance? If that vine, vigorous as it was, had been allowed to grow without training, it would probably have formed a good many clusters of inferior size, which, if left to themselves, might or might not have ripened. Or if, after training and properly caring for it, suppose the whole three hundred clusters had been allowed to remain; healthy and strong as the vine was, this would have so overtaxed its powers that the fruit would never have come to maturity, and the vine would have probably been so enfeebled and exhausted as to have been practically worthless ever after. It has not always had as good care since then; but it has borne a crop of grapes every year since, and will probably do so for many years to come. In vineyard culture in many places the Delaware fails by reason of its liability to mildew of the leaves. This can generally be prevented by an early dusting of the foliage with quick-lime and sulphur; but to be successful it must be applied while the leaves are still healthy, as it is a preventive, and not a cure after the malady has appeared and made any considerable progress. This is the additional care necessary to raise Delawares. The vine is hardy in all ordinary winters if the wood is mature, and the fruit is not liable to rot.

The Brighton, Jefferson, Lady Washington, and several of the Rogers hybrids, which are better flavored than the Concord, can in most places be grown as successfully as the latter if the vines are pruned in autumn and laid upon the ground during the winter. Where the ground is covered with snow, during the coldest weather this affords sufficient protection; but in sections where the cold is intense, and without snow, an additional protection by covering with two or three inches of earth would be necessary.

The Concord and its various seedlings, such as Worden, Moore's Early, Martha, Lady, Pocklington, Hayes and others, are, probably, varieties that can be grown in our latitude with as little care as any others. Hartiord, Ives, Talman and Telegraph may be placed in the same class. But where the thermometer, as in parts of Central Ohio, often goes down to 20° and 30° below zero, even these varieties are so badly injured that they give little or no fruit—and they fail simply for want of a little winter protection. Two years in succession, during the winters of 1883 and 1884, Moor's Early, where left exposed upon trellises, were killed to the ground; where laid down, they escaped uninjured. In all such localities it would doubtless pay well, one year with another, to give *all* vines winter protection; for in comparatively mild winters the bearing of the vines would probably be improved, and in severe ones there would be no fruit without it. In our variable and trying climate it often occurs that vines are injured in winter, but the effects do not appear until the spring or summer following. They may retain sufficient vitality to put forth leaves and bloom; but the bloom will fall off without setting fruit. At other times grapes will form, and partially grow, but the branches suddenly wither and die. Sometimes the only indication will be the falling of the blossoms, while the wood growth goes on, making apparently healthy wood for next season's fruiting. All these injuries may occur during severe winters with vines that are popularly regarded as perfectly hardy; and all may be prevented by judicious winter protection.

I have long been convinced that this winter protection is one of the most important operations in grape culture in our section, and one which will, if constantly practiced, pay better than any other involving equal trouble or expense; for it is very often the turning-point between complete success and entire failure. A member of our State Horticultural Society related his experience in this line some years ago. He began pruning and laying down his vines in the fall; but, being interrupted in his work, only finished a part of the vineyard, leaving the rest to be done in spring. When the crop was gathered the following autumn the difference was so greatly in favor of the fall-pruned and protected vines he said it would have paid him at least one hundred dollars per day for his labor if he had continued the work through the whole vineyard as he began.

There is little doubt, also, that vines, though but partially injured or enfeebled by severe cold, are rendered more susceptible to the attacks of both mildew and rot; and though the application of the remedies which scientists have recently discovered may alleviate or prevent these maladies, a healthy

and vigorous vine will do much to resist disease, and respond more readily to the influence of remedies when attacked.

I would, therefore, urge upon all grape-growers the importance of using faithfully all the means necessary to insure success; and when the finer and more valuable kinds can be grown by simply giving winter protection, do not grudge the little additional labor required. The greatly increased value of the product, as between the more common and the finer varieties, or even the increased yield and better quality of the ordinary kinds, will make it pay. At least, let those who have not already adopted the method of using all the means necessary for complete success try it upon a few vines, or upon a part of their vineyards, and, as I have said at the beginning, I believe success will be found just in proportion to the care and culture intelligently given. I have not said much about varieties of grapes, or of those most desirable to plant; but it is probable there are some of the newer and finer varieties that combine excellent quality with hardiness of vine and health of foliage. In a general way, I would advise to grow the best, and such as will yield the largest returns for the care and labor expended in their production. I have found, in my experience, that with a little additional care the best can be as easily produced as the poorest; and all know that, while the poorest will be a drug upon the market, the best will always command high prices and a ready sale.

DISCUSSION ON MR. CAMPBELL'S PAPER.

President Earle—This excellent paper opens up the whole field of grape culture. I hope that gentlemen will freely discuss the subject, giving only practical facts.

Mr. Campbell, of Ohio—Stable manure is probably the best fertilizer. Good virgin soil is best for grapes.

Mr. Ward, of Ohio—Soapsuds and the waste from the house and kitchen are fine fertilizers for our vines.

Mr. Ohmer, of Ohio—I cultivate about twenty varieties of grapes for my family use. A supply of grapes can be grown on a very small space. My son-in-law, on a small city lot, trains his vines to the fences, which afford good trellis room and at the same time seem to protect his vines from injury from cold.

Mr. Campbell—Varieties which incline to mildew may be grown to much better advantage on brick walls.

Mr. Ford, of Ohio—Varieties of the grape that will not grow and do well in the open vineyard, will do well on the walls of buildings. I have seen grapes rot badly thirty feet from a building,

while the same variety trained on the wall was sound. In the absence of walls, tight board fences serve a good purpose when used as a trellis.

Mr. Van Deman, of District of Columbia—The only place where I have known the Herbemont, which is known to be tender, to succeed well was at Dr. Warder's, where it was trained on the north side of a building.

Mr. Crawford, of Ohio—The grape is a fruit that should be universally grown. No man owning a rod of ground not covered by his buildings, should be without grapes. They may be trained to walls and fences, or permitted to climb over trees and yet they pay.

Mr. Boggs, of North Carolina—Mr. Van Deman, would you place a grape vine that will scarcely ripen its fruit, on account of the shortness of the season, on the north side of a building?

Mr. Van Deman—If your vine is tender and liable to be injured by cold winters, the north exposure is certainly preferable. We all know that rapid evaporation of moisture in severely cold weather results in winter-killing. This takes place to a greater extent on south than on north walls.

Mr. Pierce, of Ohio—The idea of training vines on north walls is contrary to all my experience and observation.

Mr. Lindley, of North Carolina—We would not plant figs on the north of buildings. We always plant them on the south of walls, under the impression that they are hardier there.

Mr. Miller—We plant grape vines around our berry fields. In this way we grow a great many fine grapes.

Mr. Campbell—A southeast exposure is preferable to a northern exposure for vines.

Mr. Hubbard, of New York—Grapes do best in a south or southeast exposure. The trouble with us is, we have too much moisture in our atmosphere for successful grape growing, and to guard against this, in a measure, we select a southern exposure for our vines.

Mr. Smith, of Wisconsin—The grape does finely with us, if it has winter protection. We prune our vines in the fall and then cover them lightly with earth. This method of treatment will almost insure us a crop every year. The Concord and Delaware

each do well with us. In vineyard culture we plant our vines eight feet apart each way.

Mr. Hillman, of Minnesota—One of our growers, on Lake Minnetonka, cultivates forty varieties of grapes. He prunes closely in the fall and covers his vines with earth, and rarely fails to have good crops.

Mr. Ford—A neighbor of mine uses a light top dressing of salt about his vines, and thinks it prevents rot.

The Society then adjourned to meet at 8 o'clock P. M.

Third Day—Thursday.

EVENING SESSION.

On reassembling, President Earle introduced Prof. McKay, of the Mississippi Agricultural College, who read his paper.

HORTICULTURE IN MISSISSIPPI.

BY PROF. A. B. M'KAY, OF MISSISSIPPI.

Mr. President, Ladies and Gentlemen of the American Horticultural Society:

Hoping that papers and addresses from those older and more experienced than myself would fill up the programme for this occasion, I did not prepare anything; but, as you have called on me to say something, I shall, without further apologies, make a few remarks on "Horticulture in Mississippi," which I trust may not be without interest to you.

Mississippi is an agricultural State, and upon her agricultural products her prosperity must, in a large measure, depend. She has no coal and iron beds, no gold and silver mines; neither can she boast of numerous manufacturing establishments, like those at the North and the East; but she has a genial, sunny climate, and a variety of soils, adapted to the growth and development of many field, orchard and garden products.

Until a few years ago Mississippi, like her southern sister States, recognized Cotton as King. Under the labor system that existed in the South before, and for several years after, the war, it was so easy to grow cotton profitably that land owners, as a rule, paid but little attention to the growing of other crops. The soil was rich, and could be had for almost a song. It was the custom to grow cotton for a number of years on the same fields, until they became too poor to produce remunerative crops, and then to abandon large tracts of these cultivated lands for new clearings, which were in turn subjected to the same ill-treatment.

Fortunately for the South, radical changes are being wrought in our industrial pursuits. Cotton, although no longer king, still whitens many fields at harvest time; but the hum of the cotton gin is beginning to mingle with the noise of the reaper and the mower. Green pastures are furnishing ample subsistence to growing herds of cattle, sheep and horses, while gardens, orchards and vineyards grace many hill-sides about our homes. We are but beginning to realize the fact that we have a great State, yet to be developed, especially in the field of horticulture.

Only a few years ago, I remember well, when the total area in Mississippi planted to strawberries would not exceed two acres; when it was thought a foolish thing, if thought of at all, to send such a delicate fruit to market five hundred miles away. To day hundreds of acres of strawberries are growing along our railroad lines. Before the vines of this region have begun to blossom, the residents of the beautiful city of Cleveland, and of other northern cities, are eating Mississippi strawberries, and are paying handsome prices for them. Your strawberry season, as a rule, lasts from two to three weeks. With us it is not an unusual thing to gather strawberries from April 10th to June 20th. The increase in peach culture has been as great, if not greater, than that of strawberries. Our first peaches begin to ripen about May 25th, and the succession of this delicious fruit continues until some time in November. It has been the prevailing opinion, even among the southern people, that it is next to an impossibility to produce a good apple in the South. On one of the tables to my right are a number of varieties, to which your Committee on Apples have just awarded a premium as being the second best collection on exhibition. Many of their plates will compare favorably with the same varieties from the best apple regions in the United States. Now, this whole collection was gathered in one neighborhood in Madison County, Mississippi, which is by no means the best apple region in the State. Pears are receiving considerable attention. Several profitable orchards, growing in different sections, might be mentioned if time would permit. After having seen the superb grapes on your markets here in Cleveland, nearly all of which were grown within a few miles of the city, I am tempted to say nothing of our grapes. I will say, however, that in the near future grape culture in Mississippi will very likely become quite a prominent feature in horticultural pursuits. Cherries, plums, raspberries and blackberries succeed in some sections, while figs and oranges do well in the southern portion of the State. Walnuts, hickorynuts, pecans, and some other nuts are indigenous to our soil.

The vegetable interest, too, is growing. Intelligent farmers along our railroad lines are turning their attention to the growing of radishes, cabbage, potatoes, onions, tomatoes, and other vegetables, to supply the demands of home and distant markets. I can safely say that for the last three years the horticultural products of Mississippi have increased, annually, 33 per cent.

But horticulture with us is yet in its infancy. Comparatively few varie-

ties of fruits, flowers and vegetables have been thoroughly tested on our soils. So far, nearly everything accomplished in this line has been done by individual effort. Our State Society, although young and few in number, is doing efficient work. Much, however, remains yet to be accomplished, not only in the testing of new varieties, but in determining the best methods of cultivation, of harvesting, and transporting horticultural products to distant markets, and of taking care of the surplus. We have as yet no canning and drying establishments, but these must begin to operate so soon as there is more surplus.

Aside from her soil and climatic influences, Mississippi's geographical position gives her a decided advantage, from a horticultural standpoint, over the adjoining Southern States. Her products go by the most direct routes to the great distributing markets of the North. I predict that in time Mississippi will become one of the leading horticultural States of this Union.

Several inquiries have been made in regard to the Mississippi Agricultural College, with which I am connected. I will conclude with a few brief remarks relating to its workings. The college is located near Starkville, on a branch of the Mobile and Ohio Railroad. The buildings are arranged to accommodate at least two hundred and fifty students. We have a well equipped museum and chemical laboratory, a good reading-room and library. The college farm embraces nearly two thousand acres of land, which is divided into pastures, fields for farm crops, orchards, garden, and campus grounds. The best breeds of stock are raised on the college farm, and all crops are grown after the most approved methods. The students receive as good an English education as can be had at the best high schools. In addition to this, they are thoroughly instructed in botany, chemistry, geology, entomology, and other sciences bearing on agriculture. The lectures given in the class-room on agricultural and horticultural topics are practically illustrated on the farm, in the orchard, in the garden, and in the nursery. Each student is required to labor so many hours each day. With his own hands he milks the cows, feeds the stock, runs the college dairy, plants, cultivates and harvests the various farm, garden and orchard products grown at the college. He receives six cents an hour for his labor, which amount is credited on his board account. The State has not supported the institution as liberally as it might have done; but with the funds at our command, we are endeavoring to throw around the students every influence calculated to show them how to make rural life pleasant, attractive and desirable.

In answer to inquiries, Prof. McKay said that the regular college course was four years, and that one term of each year was devoted to the study of horticulture.

The paper of Dr. Hape, of Georgia, was next read by President Earle.

HORTICULTURE IN THE MOUNTAIN REGIONS OF THE SOUTH.

BY DR. SAMUEL HAPE, OF GEORGIA.

In the classification of our Southern fruits, as adapted to different regions, we have named three sections, viz.: coast, middle and mountain. Of the latter section we know but little. The Georgia State Horticultural Society, of which the distinguished pomologist, Mr. P. J. Berckmans, is President, very seldom has a representative from the mountain region of the State. The fruit on exhibition rarely embraces anything from that region. The adaptability of that section, however, to produce fruit in abundance is not doubted. A somewhat different class of fruits, however, is suited to the mountain regions, as now cultivated. In the arrangement of the catalogue of the Georgia State Horticultural Society the plan adopted by the American Pomological Society is pursued as nearly as possible. The varieties are starred—* * *—for the mountain, middle and coast regions. The very great difference observed in the three regions named is particularly striking. The number of varieties starred alike in the three regions is very few of either apples, peaches, pears or grapes; and, too, many varieties that are successfully cultivated in the coast region can not be grown at all in the mountain regions. We have chosen Georgia to illustrate our subject because we know of no other extreme Southern State that maintains a State Horticultural Society. In the list of apples cultivated in Georgia we notice only such varieties as Red Astrachan, Striped June, Red June, Early Harvest and Etowah that have two stars for the three regions named—in all, five varieties. Of peaches, only two—Mountain Rose and Rivers. Of pears, four, viz.: Bartlett, Duchess, Howell and St. Michael. One variety of plums—Wild Goose. In the list of grapes we find Concord, Ives, Norton's Virginia and Scuppernong. Wilson's Albany is the only strawberry that has two stars for each of the three sections. While such fruits as figs and pomegranates are scarcely grown at all in the mountain country, yet they are very successfully raised in the coast region. Of course, blackberries and raspberries succeed better in the colder climate than near the coast. Possibly this rule may have an exception in a very few instances. From Major A. K. McCutchens, of the State Horticultural Department, we learn that winter apples grown upon mountains of Northeast Georgia are much less subject to rot than the same varieties grown elsewhere in the State. This may be attributed to the altitude of the country, and the consequent late spring and cooler summer and fall season. In the valley of North Georgia, and generally throughout the State, few winter varieties keep well, while on the table lands of Northwest Georgia and the high country in Northeast Georgia almost any variety will mature and keep as well as the same grown further north, in New England or elsewhere. This is a most important fact in relation to fruit-growing in this country.

The South has heretofore afforded a market for Northern and Western

grown apples. By extending the average of the apple in the region adapted to its culture an important industry will develop that has heretofore been neglected. The success that has attended the apple crop in the mountain sections, though attained generally without care in the selection of varieties or skill in the management of the crop, has been, by far, greater than that of other portions of the State, even in orchards most skillfully managed.

The mountains are less subject to heavy dews than the lower grounds, and are believed to be better adapted, for this reason alone, to the growth of the vine. The grape has not been planted to much extent in such localities, but from limited observation it is believed that the varieties cultivated are less liable to rot than the same grown in the adjacent valleys. Before dismissing this subject, which doubtless could be made more interesting if better data could be obtained as to the crops usually cultivated in the mountain region, I will again quote from the same authority as to the frosts prevalent in spring in the mountain regions of the State of Georgia:

As regards peach culture, when there are partial failures of this crop it is a fact of common observation in mountainous and hilly sections that orchards in certain elevations, or otherwise protected situations, almost invariably escape the effects of frosts. This being true, to know just where to locate orchards advantageously in this respect is a most important problem with the fruit-growers. By careful observation of the features of the country and the relative situation of such favored locations, a rule may be formulated for the proper location of new orchards for this advantage. Such situations may be found on mountain slopes, on the crests and slopes of ridges, and in the more level portions of the State on the hills adjacent to river valleys.

All have heard of a 'thermal belt," a mythical zone somewhere in the mountains exempt even from cold weather. This term, in the singular and specific way in which it is used generally, carries with it the idea of a single belt of country so exempted from frost; while, indeed, there are as many belts as there are ridges, and, in addition, a vast number of "thermal spots," dependent upon the existence of hills or knobs reaching two or three hundred feet above the level of the adjacent valleys. In any variable climate, such as this, where the surface is broken, localities may be found, ranging from two hundred to one thousand feet above the general surface of the country, having greater or less immunity from spring frosts. That of from two hundred and fifty to six hundred feet is believed to be, under most circumstances, the most favorable. This holds good without regard to the general elevation of the valleys above sea level. On the more mountainous portions of the State sheltered locations at the base of mountains, and the entire escarpments, commonly escape from the effects of late spring frosts. The difference in effects thus due to altitude is observable in all countries having great irregularities of surface that are subject to frosts. In more northern latitudes, where the winter impinges upon summer, crowding out the variable spring seasons, the difference in effect of frost is less observed. Portions of the United States where such differences in frosts are most per-

ceptible are Western North Carolina, East Tennessee and North Georgia. Favorable situations for orchards exist in North Georgia on the slopes of mountains and table-lands from base to top, and on the crests of ridges in the valleys; in Middle and South Georgia, on the summits of high hills, and on hill slopes adjacent to river valleys. The proper location should be precisely determined, by observation, for each locality. This may be made any frosty morning in ascending a high elevation. Then it will be found at some point on the rise that the frost will be succeeded by dew; and still higher up on the incline the dew itself will disappear, leaving the surface, if covered with litter, dry enough to burn. If this observation is made in the forest, some allowance is to be made for timber in preventing the radiation of heat, as the formation of dew and frost extends somewhat higher on lands that are denuded of forest growth. The trees of an orchard, being smaller, and usually less dense, prevent the low reduction of temperature in a less degree. From this it will be observed that the mountain regions of the States named are peculiarly fitted to the successful culture of fruit. The point to be attained is simply taking advantage of nature's rich gifts in orchard lands free from spring frosts. The one great drawback is the distance generally from railroads. Time will doubtless work great changes in this regard, and we hope, at no distant day, to witness peach and apple orchards laden with luscious, tempting fruits on mountain slopes now comparatively worthless, and the golden harvest succeed the scanty pittance that is now wrung from those everlasting hill-sides.

Following the reading of Dr. Hape's paper, Dr. McKay, of Mississippi, spoke at considerable length on the advantages of his State for fruit-growing. Our section is not mountainous, as is Northern Georgia, but rather level, being elevated less than one hundred feet above sea level. Yet we succeed well even with some varieties of the apple of Russian origin. The Tetofsky is getting to be one of our popular apples. The collection of apples on the exhibition tables in this hall were grown in latitude 32° north. The strawberry is one of our most successful small fruits. The strawberry season with us lasts about three months, instead of three weeks, as with you.

President Earle—We will now listen to the paper of Mr. W. P. Corsa, of Delaware, which Mr. Myrick, of Massachusetts, will read in your hearing.

PRACTICABILITY AND BENEFITS OF SELLING FRUITS BY AUCTION.

BY W. P. CORSA, OF DELAWARE.

An exchange for the sale of fresh peaches was for years a theory with me before I could find that encouragement among growers which warranted an effort to put it into practice. Believing that the grange of our State was the best organized effort of farmers in Delaware for the accomplishment of good, I took occasion to urge upon the then Master of our State grange, Mr. John J. Rosa, the practicability of this method. He heartily embodied my suggestions in his annual address to the State grange in December, 1882, and gave me a committee upon the subject composed of some of the most positive and energetic men in the State, with instructions to report at the next annual meeting. At the following meeting this committee was able to report a charter obtained and about three thousand dollars subscribed to the capital stock, but no business regularly attempted, because growers mainly preferred to blindly trust conditions abroad, of which, in the nature of things, they could know nothing, rather than to trust a new effort at home wherein they could see some imperfections. But the agitation of the subject by personal solicitation of buyers, by letters to agricultural and other papers, and by public discussion among growers, brought about a concentration of buyers at Wyoming, the principal peach shipping station, and the home of the majority of the Fruit Exchange Committee.

Growers found that the auction method recommended by the exchange insured the best prices from these buyers, thus concentrated, but in turn were not yet ready to give fruit systematically graded and inspected at the exchange, urged for the encouragement and protection of buyers. A few growers, however, the exchange advocates, carefully assorted their fruit, much to the satisfaction of buyers, and the principle made very natural, though slow, growth. This season makes the third year of active operations by the Delaware Fruit Exchange, with an annual increase of success for itself and those doing business through it, with innumerable converts to its theory, though it is not yet without opposition. It has a record for honest methods and efforts that commends it to every one who will investigate, and a reputation that is broader than the nation. Numerous pattern societies have been and are being established in Florida, California and other States. If the exchange is not a convincing proof to all the members of the American Horticultural Society of its usefulness, it is, nevertheless, a growing organization, that is giving us better distribution and more uniform prices for our fruit, while it has exercised a more marked influence upon the condition and grading of our peaches than any other method of general marketing In detail, its history might have been embellished with figures showing its financial power for good and its proportional growth in the great industry of our peninsula. We might have shown how by it the expense of marketing

has been reduced and the certainty of better distribution secured, and hence a market insured; how railroads have been influenced to see in the encouragement of our fruit industry their own interest, and how growers, by transposing from their side of the problem the x y z of transportation, have brought the burdens of this quantity to bear more directly upon those (the buyers and dealers) to whom railroads, in their competition, more readily make concessions. We might have shown the almost religious zeal with which some commission men contend against the establishment of this method of growers selling their own produce, and the vote of a legislator against granting a charter, which, in his opinion, was flying in the face of Providence by inviting the common people to the tree of knowledge. Above all, as a thing of mystery, a condition as real as it is inexplicable, we might have shown the bitter opposition of growers themselves to the establishment of an organization that threatened no market already existing, nor in anywise abridged their privileges or opportunities, but offered only additional facilities, and by concert of effort a broader field, for the sale of fruit.

As studies for those who may desire to establish like organizations for their own industries and their own communities, these facts may afford valuable suggestions, and are to be found in the history of our exchange. I have only mentioned a few of the major landmarks of our way. Let no one think that our work is yet fully accomplished, nor that our task hitherto has been a light one. The requisites for a successful fruit exchange are, primarily, a sufficient quantity of superior fruit to attract buyers, a sufficient number of buyers to insure competition, and transportation facilities that insure quick and careful delivery. As these conditions are all attainable in some portion of this broad Union upon the interests of some one fruit or agricultural product, I assume that somehow an exchange may be established for the major interests of each; and that, with a charter sufficiently broad, each of these exchanges may deal in all other fruits of its locality. Let no one assume that the especial interest of his locality is an exception, or that it presents difficulties insurmountable. If the three conditions above enumerated can be made to exist, the exchange method can be made to work. Some one may ask if I would advise for any special locality an apple exchange. Yes, if the three conditions mentioned can be obtained. The very general culture of the apple makes of this best fruit so common a blessing that buyers need not generally go long distances for their supply; hence the difficulty of securing in this fruit as a major interest the necessary competition among buyers. Yet apples, pears, plums and other fruits frequently change hands among members in Delaware who have come together in the main interest of the peach.

The territory to be comprehended within the purview of an exchange is only to be determined by circumstances, sometimes natural, sometimes artificial. It should include the producers to the furthest extent at which there can be effected concert of grading and shipping, whether this includes a part or the whole of one State or of several. Of the buyers and dealers, it

should include the furthest city capable of receiving the fruit in good condition. Above all, the location for buying and selling needs to be in such proximity to the grower that the burden of transportation shall become a direct question between the buyer and his encouraging transportation company, and not between the grower and all the transportation lines by which produce must be carried to consumers.

What benefit have we found in such public selling of fruit? Much every way. 1. Until this method was adopted growers were in continual controversy with transportation companies over real and fancied impositions and lack of accommodation. Now such controversies are unheard of. 2. The return of empty packages was an uncertain dependence that gave much annoyance. Now we sell the package with the peaches, and from all distances where transportation does not eat up their worth they are returned in quicker time and better condition, to be sold for their worth by auction to growers again. 3. We have more general information of the market, get by competition a better daily distribution of fruit than ever before, and consequently better prices. 4. Heavy freights, commissions and cartages went with the end of the stick that farmers have thus cut off. 5. Cash is insured for all purchases. A buyer can not cover a weak financial condition from the knowledge of many growers. 6. A personal acquaintance between dealer and grower. 7. If fruit has no value in the markets, the grower learns of it at the exchange without the expense of freights to distant markets. 8. Last, though not least, a better condition of the fruit and more satisfactory grading of it secured, making it possible for buyers to send long distances with hope of profit.

I believe that if a determined effort could be made, in many localities, to improve the marketing methods of farm products, we would introduce a wholesome thrift into agriculture that would eliminate much of the lottery nature of our calling that now palsies effort.

DISCUSSION ON NEW GRAPES.

The remainder of the evening session was mainly taken up by the following discussion of the newer varieties of grapes:

BRIGHTON.—*Mr. Hubbard,* of New York—The Brighton is giving good satisfaction in our State.

Mr. Harrison, of Ohio—It is behaving well at Painesville.

Mr. Smith, of Wisconsin—Quite promising at Green Bay.

Mr. Green, of New York—Doing well in some vineyards at Rochester.

Mr. Cushman, of Ohio—It mildewed at Euclid this year.

Mr. Van Deman, of District of Columbia—It has done well in Missouri and Kansas, but I think it a little tender.

Mr. Hillman, of Minnesota—The Brighton is quite promising in Minnesota.

DUCHESS.—*Mr. Hubbard*—Duchess behaves well on the shores of Canandaigua Lake. Needs winter protection.

Mr. Ford, of Ohio—It is making a fine growth with me.

POCKLINGTON.—*Mr. Cushman*—Pocklington is doing finely with me.

Mr. Ford—It is a slow grower.

Mr. Hubbard—Pocklington must have good soil and culture. It is improving with us.

EARLY VICTOR.—*Mr. Ford*—The earliest with me, and fair in quality.

Mr. Cushman—Not making a good impression with me.

Mr. Hubbard—It is not as early as Champion or Moore's Early. Not worth much with me.

JEFFERSON.—*Secretary Ragan,* of Indiana—It loses its foliage badly with us.

Mr. Crawford, of Ohio—The Jefferson is poor with me.

Mr. Green, of New York—It is too late for us, at Rochester.

WYOMING RED.—*Mr. Green*—It does finely on the Hudson.

Mr. Hubbard—It is an old grape, but not much known. It is early, bright red, and attractive. Well thought of where grown. The vine should not be pruned too close.

VERGENNES.—*Mr. Crawford*—Loses its foliage with me.

Mr. Ford—Rots badly. I never saw a decent cluster.

Mr. Cushman—Vergennes is fairly promising with me.

Mr. Hubbard—It is quite promising in our locality.

MOORE'S EARLY.—*Prof. Troop,* of Indiana—One of our best early grapes.

Mr. Green—It is a valuable early grape at Rochester.

Mr. Cushman—It is grown largely at Euclid, and sells for good prices, though not as good as Worden.

Mr. Hubbard—Not as productive as Concord, nor as good as Worden. Must have good soil and culture.

MONTEFIORE.—*Mr. Harms*, of Ohio—This new grape is doing well in my vineyard at Euclid.

JESSICA.—*Mr. Crawford*—Earlier than Victor or Lady. Cluster and berry larger than Delaware, and of fine quality. Mildewed slightly last year; none this.

Mr. Cushman—Some mildew on Jessica this year.

Mr. Hubbard—The Jessica is only suited to amateur culture; too small for market.

NIAGARA.—*Mr. Van Deman*—I saw two thousand vines of the Niagara, loaded with fine fruit, on my recent visit at Fort Worth, Texas. The fruit was selling readily at twelve cents per pound.

Mr. Cushman—I look upon the Niagara more favorably than formerly. It, however, rots some in unfavorable seasons.

Mr. Green—A vigorous grower and productive.

Mr. Hubbard—It rots about as badly as Concord, with foliage not so good. A year ago last winter it was injured by the cold. It is of better quality than Concord. It succeeds well at Brockton, and better still at Lockport. It is a good market and shipping grape.

Mr. Crawford—I consider the quality no better than the Concord.

Mr. Myrick, of Massachusetts—Does it ship as well as is claimed for it?

Mr. Hubbard—I think it ships well.

Mr. Markle, of Arkansas—We have received them from Lockport, New York, in fine condition.

Mr. Lindley, of North Carolina—It is a fine grower, and I think will ship well. It is being planted in South Carolina for shipment to Northern markets.

Mr. Hollister, of Missouri—The Niagara, or any other white grape, will not do for long shipments. White grapes may do well for near markets, but when shipped long distances they are more or less bruised and broken, and soon turn brown and unsightly, so that they will not sell readily. Colored grapes are, of course, just as badly bruised by shipment, but they do not show it so distinctly.

Specimens, such as Mr. Markle speaks of receiving, are packed with extra care, and, of course, go through in better condition.

EMPIRE STATE.—*Mr. Crawford*—The Empire State is healthy and promising with me.

Mr. Cushman—It is not so vigorous as I had thought to find it, and inclines to mildew.

Mr. Green—It is healthy in New York State.

Mr. Van Deman—It is a vigorous grower in Kansas. Has not fruited there yet.

Mr. Hubbard—It is too vigorous, if any odds, to set fruit well.

Mr. Cushman—I admit that mine have not had the most favorable location for good healthy growth.

ULSTER PROLIFIC AND POUGHKEEPSIE RED.—*Mr. Green*—Ulster Prolific and Poughkeepsie Red are two promising varieties.

Mr. Crawford—Poughkeepsie Red is not a good grower.

Mr. Caywood, of New York—Too much growth is not desirable. The Ulster Prolific is a fair grower with me. Out of one hundred or more varieties grown by me, Ulster and Black Delaware are the healthiest.

Mr. Cushman—I have fruited the Ulster this year, and am pleased with it.

Mr. Green—Mr. Cushman, have you fruited the Poughkeepsie Red?

Mr. Cushman—I have not.

Mr. Hubbard—Of the two the Ulster is the more valuable grape, in my judgment.

President Earle—In all this discussion we have had nothing on the subject of keeping grapes, nor on that more essential thing with us, bagging them to prevent rot. Bagging is absolutely essential to success in raising grapes in most parts of the Mississippi Valley. Bagging costs us about one-half cent per pound, which is money well spent.

Mr. Smith—We can raise fair grapes without bagging, but they are much better with it, the market price being about three cents per pound higher than those not bagged.

Mr. Pierce, of Ohio—Grapes may be kept in cold storage well into the winter, but, as a rule, they are not as high-priced in February as they are in October.

Mr. Hubbard—City markets are generally supplied in winter with grapes which have been in cold storage.

Mr. Green—It costs about ten dollars per ton to keep grapes in cold storage, and there is generally a loss to the party storing them.

The President—Before adjourning, I wish to call attention to the excursion to Euclid to-morrow. Those who would go must be promptly on hand at 8 o'clock A. M.

On motion, the Society then adjourned.

ADDITIONAL PAPERS.

Following a precedent, long established, the Secretary here presents a number of valuable papers, which, although on the programme of the meeting were not read, owing to want of time and the absence of the authors. These papers are no less worthy on this account, and the Secretary bespeaks for each a careful perusal at the hands of the reader.

ORCHARD RUSTS.

BY PROF. A. B. SEYMOUR, OF CAMBRIDGE, MASS.

The little group of fungi which produce "rust" in apples, pears and quinces have a special present interest, first, because their injuries are attracting the attention of cultivators, and, second, because our knowledge of their mode of growth has received important additions during the last few months, enabling us to more intelligently combat them. It is in reply to complaints of injury to fruits in various localities that this article is written. These fungi have two distinct forms and two distinct stages of development, which occur on two very different kinds of plants, and would at first appear to have no connection whatever. But investigations have proved that each stage of growth in its turn comes from the growth of the spores of the other stage. This is called alternation of generations. The rust upon apples develops through the summer, and toward autumn produces spores, which are carried to the cedar tree. Here they germinate and produce a different form of the fungus, which begins its growth in the fall, lives through the winter and matures in the spring, expanding into conspicuous yellow, jelly-like masses. The spores now formed are carried in the air to the apple tree or some tree of that group, where they produce the apple rust or quince rust as the case may be.

Such is the life history in brief; but it needs to be examined more minutely. It is best to begin with the form upon the cedar. This is common in May, and is familiar to many. It is the so-called cedar-apple (*Gymnosporangium*). It appears on the branches of the cedar as a round brown or yellow jelly-like mass, swelling out to greatly increased size after a rain, developing a number of sprangling appendages of similar substance, radiating in all directions from its surface. Its growth, however, does not begin in the spring, but in the summer or fall before, when, by close observation,

it might be seen as a small brown sphere. This may swell to a considerable size before winter, but not until spring is it conspicuous enough to attract much attention. Sometimes it pushes aside the branch to which it is attached and appears to be at the end. In the spring it grows to any diameter not exceeding an inch or an inch and a half, and small protrusions of a brighter brown are seen at different points on the surface. These may become elongated. (Fig. 1.) If the ball is picked before it is swollen by the spring rains it may, by way of experiment, be made to develop in the house.

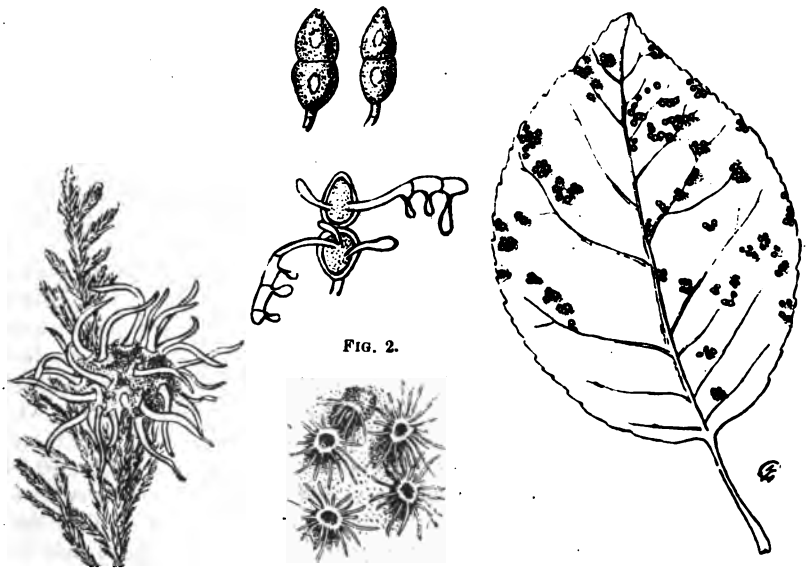

FIG. 1. FIG. 4. FIG. 3.

Fig. 1—Branch of red cedar, with cedar-apple (*Gymnosporangium macropus* Lk.) and its appendages before they have been swollen by rain. (After Farlow.) Fig. 2—Spores of *Gymnosporangium macropus*, with portion of supporting stalks, highly magnified. The one below is germinating, producing sporidia on its threads. (After Farlow.) Fig. 3—Leaf from an apple tree, with "rust" (*Æcidium pyratum* Schw.). Cups of the fungus collected in small clusters. Fig. 4—Cups magnified.

Place it on a saucer, turn a tumbler over it, and keep it moist. But left to its natural growth on the tree, it develops in May after a rain. The whole ball swells, but the protrusions swell most, and become long sprangling arms of bright yellow jelly. A microscopic examination shows imbedded in the jelly numerous spores, each divided across the middle by a partition (Fig. 2), and attached to a long, slender stalk, of which only a very small portion is shown in the figures. The spores now germinate, and each cell produces one or more short filaments, from which arise spore-like bodies called sporidia, as seen at the lower part of Fig. 2.

Careful experiments many times repeated have proved that the germinating sporidia sown upon the leaves of apples, pears, etc., grow there and produce the rust. The fungus is picked some days before the time for its natural maturity in order to make the artificial sowings and cover them before the spores remaining upon the trees are scattered by the wind. They are made to develop under an inverted tumbler or bell jar as mentioned above. The cedar-apple is moistened and kept in this way in a moist atmosphere. It swells and matures its spores, which germinate in the manner shown in the lower part of Fig. 2, by sending out short threads, which bear secondary spores (*sporidia*). The latter fall down, and are so plentiful that they form a yellow coating over the plate on which they fall. These, or the germinating spores themselves, are placed upon the experimental plants—wild and cultivated apples, thorn-apples, June berry and other pomaceous plants upon which it is desired to make the test. One method, practiced by Prof. Halsted during the past season, is to sow the spores upon the ends of branches of trees in the open air and then cover with sacks to prevent infection from other sources. An equal number of branches upon which no spores are sown are similarly covered as checks against error.

Another method is to have seedling plants or detached branches or leaves under bell jars in the laboratory. Some are inoculated and others kept for checks. Error is also guarded against to some extent by starting cultures before the time for the natural scattering of the spores. In either method if the inoculation is successful the sporidia grow by sending out threads, which penetrate the leaf tissues and at length produce the apple rust. The first effect upon the leaf is seen in a few days after the sowing as discolorations, which soon become bright orange spots. This change is produced by the threads of the fungus which have ramified through the leaf tissues at that place. Commonly within from five to twelve to nineteen days the first stage (*spermogonia*) of the apple rust appears. The spermogonia may be seen as little black specks on the upper leaf surface in the center of the yellow spots, but the rust is not mature until the second stage of development appears on the under surface, which does not occur for some time.

Natural sowings in the forest or orchard develop in the same order. The structure of the fungus is as follows: The microscope shows the spermogonia to be hollow bodies lined with slender filaments which bear at their ends very minute spore-like particles (*spermatia*). The latter do not germinate readily, and their use to the fungus is not well known. Later in the season clusters of cylindrical cups grow out upon the under leaf surface and their walls are lacerated into slender segments (Figs. 3 and 4). In the cavity of the cups brownish spores are formed in chains. At first they are angular from mutual pressure, but soon become more nearly spherical. These have come from the growth of the spores of the cedar fungus, and in their turn are carried by the wind to the cedar, where they begin the cycle of growth anew. The connection thus shown is indicated by other evidences: (1)

The spores of the cedar fungus mature in May, the apple fungus is seen soon after in May or June, though it does not usually become very conspicuous until July or August. (2) The spores of the apple fungus mature in July and August, the cedar fungus is found in its early stages soon after. (3) Where one is plentiful the other is also.

CLASSIFICATION.

There are several species of *Gymnosporangium*, and corresponding forms of *Rœstelia*. The form described above (*G. macropus*) is the commonest and most conspicuous, and is now proved to be connected with the commonest form of rust on cultivated apples and wild crab-apples.

LIST OF SPECIES FOUND IN THE UNITED STATES.

Gymnosporangia.

G. Ellisii, *G. biseptatum*, } on white cedar (*Cupressus thyoides*).
G. globosum, *G. conicum*, *G. macropus*, } on red cedar (*Juniperus Virginiana*).
G. clavipes, *G. fuscum*, } on red cedar and juniper (*Juniperus communis*).
G. clavariæforme, on juniper.
G. speciosum, on *Juniperus occidentalis*, Rocky Mountains.

Rœstelia.

R. botryapites, on June berry (*Amelanchier Canadensis*).
R. transformans, on *Pyrus arbutifolia* and cultivated apples.
R. cornuta, on mountain ash (*Pyrus Americana*), June berry and hawthorns (*Cratægus*).
R. lacerata, on hawthorns, June berry and wild and cultivated apples.
R. pyrata, on the wild crab-apple (*Pyrus coronaria*), cultivated apples and June berry.
R. hyalina, on hawthorns.
R. aurantiaca, on hawthorns, June berry, quinces and cultivated apples.
The occurrence of *R. cancellata* on cultivated apples and pears is very doubtful.

This enumeration is compiled from the "Gymnosporangia of the United States," and more recent articles by Prof. W. G. Farlow and Mr. Roland Thaxter, referred to below. Most of these are found along the Atlantic coast. *Gymnosporangium macropus* is the only prevailing species in the West, but *G. globosum* has been found in Wisconsin, and a form probably to be referred to *G. conicum* in Iowa.

Of the *Rœstelia*, *R. lacerata* and *R. pyrata* are both common in the Mississippi valley, the former usually upon hawthorns, the latter upon wild crab-apples and cultivated apples. The first

EXPERIMENTAL CULTURES

to determine the connection between *Gymnosporangium* and *Rœstelia* were made in Denmark by Oersted over twenty years ago. He found three species of the former in that country, and three forms of the latter severally

connected with them. They were *G. conicum*, with *R. cornuta; G. fuscum*, with *R. cancellata; G. clavariæforme*, with *R. lacerata.* He considered *R. pencillata* to be a variety of *R. lacerata.* Others think it distinct. His experiments were repeated by several other botanists of the first rank in Europe. In this country Prof. Farlow made cultures for several years, with partial success. In 1886 the experiments were repeated by Mr. Roland Thaxter while he was studying with the former. The results are given by the former in the Botanical Gazette for July and September, 1886, and by the latter in the current volume of the Proceedings of the American Academy of Arts and Sciences. Other experiments by Prof. B. D. Halsted are described by him in the Botanical Gazette for July and the Country Gentleman for October 21, 1886. Mr. Thaxter made his cultures in the city of Boston, several miles from any cedars, so that there was little danger of accidental infection. The danger of mixing the species was reduced by making the cultures in four different rooms, and when practicable keeping the plants covered for twenty-four hours after infection. After that period they were kept uncovered, in order to insure the natural conditions for growth.

Results: Five species of *Gymnosporangium* produced mature *Rœstelia* upon plants upon which they were sown as follows:

G. conicum produced *R. cornuta* upon June berry leaves.

G. clavipes produced *R. aurantiaca* upon young shoots of June berry.

G. clavariæforme produced *R. lacerata* upon hawthorn.

G. biseptatum produced *R. botryapites* upon June berry.

G. macropus produced *R. pyrata* upon cultivated apples.

The last of these is of greatest interest and most practical importance to orchardists, as it is the principal one which injures their trees and fruits. *R. pyrata* is the *Æcidium pyratum* described by Schweinitz upon *Pyrus coronaria.* It has heretofore been considered identical with *R. pencillata* of Europe; but after a careful comparison of authentic European specimens, Mr. Thaxter gives good reasons for his conclusion that no form known to him in this country should be referred to *R. pencillata.*

By the method already referred to Prof. Halsted produced the rust upon wild crab apples in May, 1886, by sowing spores of *G. macropus*, which is the only species found by him at Ames, Iowa. His experiments upon cultivated apples yielded no result.

Prof. Farlow thus describes a "natural culture" observed by him in 1886. "In the latter part of June I noticed at New London what might be called a natural culture of *G. macropus* on a wild apple [*Pyrus Malus* escaped]. A small *J. Virginiana* (red cedar) and a small apple had grown together in such a way that they seemed to form but one tree. My attention was first attracted by the immense number of bulbs of *G. macropus* on the cedar. They were so numerous as to make it look like a decorated Christmas tree. I had never seen a cedar so covered with *Gymnosporangium*, and at the same time the apple was yellow with the spermogonia of a *Rœstelia*, at the time immature, but which afterward developed into a form of *R. pyrata.*"

INJURIES TO ORCHARDS.

A form on cultivated apple trees is very prevalent in Western Massachusetts, where the trees are often so completely infested that scarcely a leaf remains healthy, many fall off, and the whole foliage of the tree has a yellowish, sickly appearance, an effect chiefly due to the yellow spots, but in advanced stages the rest of the leaf becomes more or less yellow. A form appears to be even more destructive in the vicinity of Centralia, Ill. Reports of injuries there were sent and in answer to inquiries the following letter received, addressed to Prof. T. J. Burrill:

MARION COUNTY, ILL., Aug. 15, 1886.

DEAR SIR: Red cedar is not indigenous here, but has been planted for ornamental purposes the last thirty years—a few at first, but increasing until there are cedars all over the county. Many of these have borne seed; the birds carried the seed to the woods, until it is not uncommon to find young cedars scattered through the forest. They rarely attain much size, however, until they are transplanted to some one's dooryard. On my own and adjoining farms there are, perhaps, twenty to thirty of these older trees, with several hundred of all ages down to those not a foot high. The older trees have for years borne the fungus now familiarly called "cedar apples," which you described so well at our Centralia meeting last December. I have for several years known that there was something wrong with some of my apple trees—particularly with the "Rome Beauty" and "Red June," but never until that meeting knew what it was. It has been gradually spreading and getting worse from year to year, until it is now seen for several miles east, south and west—the forest is north of us. It seems worse in my own orchard than any other I have seen—probably because my next neighbor and I have more old cedars—notably on the "Rome Beauty" and "Red June," which were nearly killed with it this season. About all the leaves that came out previous to the 20th of June were so badly affected that most of them fell off. The fruit of those two varieties seemed affected with the same fungus, and most of it fell off prematurely. The wild crab is quite as badly affected—worse in leaf and not quite so badly in fruit, with what I take to be the same.

That yellow jelly-like substance came on the cedar balls with our first warm spring rains, remaining out a day or two, according to the weather, and continued so to come until about the middle of June. On the 19th day of June I discovered a young crop of these cedar balls coming on the young growth of the cedar trees. They were then no larger than the head of a pin, but have grown steadily since. The old crop appeared to mature and die off about this time. The trees (cedar) have not set one tenth so many balls as they had last year. If these young cedar apples are produced by the spores of the fungus on the apple *leaf*, how do you account for their production before the maturity of the rust on the apples? The first thing noticeable in the spring on the apple were small specks of that bright yellow rust on the upper side of the very small leaves that put out with the bloom. As the larger leaves came out, they were worse specked, the specks increasing in size until a large number of the leaves were totally affected and fell off. When the apples were about an inch in diameter I noticed that some of them were affected

similarly. About the 10th of July the rust began to bloom on the under side of the affected leaves that had not fallen off; also on the affected portions of the fruit, and has remained in bloom both on the leaves and the fruit till now, when it is almost gone. It is hard now to find perfect specimens to send you. It does not affect all varieties alike. On some it looks very much like some kind of acid that had been sprinkled over the leaves, leaving minute dead spots on them, that do not grow through the leaf, and do not bloom at all on the under side. Naming the varieties in my own orchard in the order they are injured, I would say, Rome Beauty, Red June, Sweet June (Hightop), Strawberry, and Siberian Crab are all affected, both leaf and fruit. Bailey's Sweet, Rambo, Willow Twig, Yellow Belleflower, Penn., Redsteak and Maiden's Blush, are affected in the leaf only. Early Harvest, Red Astrachan, White Belleflower, Ben Davis, Winesap and Limber Twig are not injured in either leaf or fruit, except an occasional chance specimen, although they are quite as much exposed as any. In fact, I think exposure within a mile counts but little where we have so much of the poison. My young Jonathan orchard half a mile away from any cedar trees except a row of young trees just planted, seems as badly affected in the leaf as those that were planted near the old trees. Our winds in the spring and summer are variable, blowing sometimes toward all points of the compass the same day, and there seems to be plenty of the vile poison to go clear around—isolated cedars in the fence rows a mile from the orchard have the balls on, and isolated wild crab apple a mile from any cedars will be literally covered with the fungus.

It is a matter of impossibility with us to convince our neighbors that destroying the cedars will arrest this fungus—though I have been at it for a week—have grubbed up hundreds of young cedars in that time. J. G. VAUGHAN.

The accompanying specimens were in excellent condition, and illustrated well the descriptions in his letter. The "new crop" of cedar apples has not been previously known to the writer to appear so early as June. The balls sent (Aug. 15) with the letter are as large as half an inch in diameter. There is no indication to the naked eye of spore formation.

The forms of *Rœstelia* sent are those ordinarily found on leaves of Hawthorn (*R. lacerata*) and on wild crab and cultivated apples (*R. pyrata*); but those on the wild crab and cultivated apples are very dissimilar. The form on the fruit of both these is similar, and different from any of the forms on leaves, being rather long, erect, cylindrical cups with spreading border, cut into rather broad segments. These apples were attached to the same branches whose leaves bore the other form.

Mr. Vaughan does not mention the form on Hawthorn as unusually prevalent. We are convinced that his mode of treatment is the correct one and that by the co-operation of all the cultivators in any region the disease may be greatly reduced. The rust is found on wild crabs at long distances from any cedars. It is desirable to exterminate these also, as they are oftener infected than the cultivated fruits, and afford a source of infection to the cedars. His observations show that some varieties of apples suffer more injury than others, and the same is shown by Mr. J. B. Ellis, as follows:*

*American Naturalist, 1883, p. 1281.

"In my orchard is a row of red cedars (*Juniperus Virginiana*) running east and west. At a distance of sixteen feet north of this row of cedars is a row of apple trees, and at distances of sixteen and thirty-two feet on the south side of the cedars are also rows of apple trees. For eight or ten years now, in the latter part of May, the cedars have been heavily laden with *Gymnosporangium macropus* and *G. clavipes*, and in the early days of June, when these fungi have begun to dry up, the leaves of the apple trees standing on each side begin to show the spermogonia of *Rœstelia;* but it is always noticeable that the apple trees are not all affected to the same extent. For instance, on a tree of the variety known here as Fallawater, and standing in the row of trees north of the cedars, almost every leaf is invariably spotted with spermogonia, and later in the season, in August, is literally loaded with *Rœstelia* (N. A. F. 1086, d.). Next to this tree stands one of the variety known as Summer Sweet. Part of the leaves on this tree show the spermogonia in the spring, but never produce the *Rœstelia.* Next stands a Baldwin. This, like the Fallawater, shows an abundance of the spermogonia, and later of the *Rœstelia.* On the south side of the cedars the first row of trees is of the variety called Yorkshire Russet (the trees imported from England). These trees all show spermogonia in the spring, but never mature any *Rœstelia.* In the next row south are several varieties of apples, among which the English Russet shows the greatest abundance of spermogonia, and matures a few imperfect specimens of *Rœstelia.* From the above statement it will be seen that all the apple trees, even those standing at the same distance from the cedars, are not equally affected; and it is to be noted that those which are the most affected are all varieties which do not flourish in this locality, among which notably are the Baldwin and English Russet. This seems to indicate that an enfeebled condition of growth in a tree renders such a tree more liable to the attacks of the parasitic fungi mentioned, and this may have a direct bearing on the artificial culture of *Rœstelia;* for, although this has not, so far as I know, been demonstrated by actual experiment, it is altogether probable that seedlings raised from apples grown on a tree which annually bears a crop of *Rœstelia* would be more liable to the attacks of this fungus than seedlings raised from apples grown on trees not so affected. I am led to suspect this the more from having the past winter raised some seedling apple trees in a flower pot in the house, and from my utter failure to produce even spermogonia on these seedlings, although at the proper time last spring I placed fresh spores of *Gymnosporangium* on their leaves. In order to test this matter more fully, I have saved seeds from apples grown on the Baldwin, which, as stated, was badly affected with *Rœstelia*, and from apples grown on a tree next to it which was unaffected with *Rœstelia*, in order to ascertain, if possible, whether the seedlings from these two trees will show any difference in their susceptibility to receive *Gymnosporangium* spores."

THE DISEASE IN QUINCE FRUIT

Sent from South Coventry, Conn., by Mr. Chas. Kalby, was caused by *R. aurantiaca*, which is distinguished by its long, slender cups and bright orange spores. The cups are scattered over half the surface of the fruit, giving it a striking appearance. This disease of the quince is not rare in New England. This form also occurs upon unripe fruit and stems of various hawthorns, June berry and cultivated apples from Vermont to North Carolina, in Missouri and Northern Michigan—collected at the latter locality in 1885 by Prof. Burrill.

As seen above, this is connected with *Gymnosporangium clavipes*, which grows on the branches of red cedar and juniper, and is much less conspicuous than the form shown in Fig. 1.

It is difficult to account for the common occurrence of *R. lacerata* in large regions of the Mississippi valley where *G. clavariæforme* has not been reported and juniper is rare or wanting, but practically it is now seen to be a matter of minor concern, since it seldom injures orchard fruits directly or indirectly.

The interdependence of the commonest injurious forms proved, all will carry out preventive measures, feeling greater certainty of success:

1. Cut out the red cedars, or keep them free from the fungus.
2. Cut out the easily infected wild crabs and escaped apples.
3. Reject, when practicable, those varieties of apples which experience shows to be very susceptible to the disease.

In these measures, to secure success, all must co-operate.

PROFITABLE HORTICULTURE.

BY C. L. ALLEN, OF NEW YORK.

It is not my intention to speak to you to-day on what is generally considered the direct profits of horticultural operations, or the manner in which they may be derived, although you may have inferred from the announcement that such was to be the case. If there is any deception in the matter, let me assure you it is an innocent one, evolving from our different conception of the meaning of the work "profit." Our opinion is that the profit from any pursuit can only be estimated by the amount of happiness that we harvest, rather than the amount of money our crops or other productions yield after paying all indebtedness. This being our opinion, we shall give it as such, taking it for granted it is my views you want, or you would not have called upon me. And it will be well to remark that by occupation I

am a farmer, although many of you, in going over our farm of two hundred acres, might possibly conclude that ours is the poetry of farming.

We would say, for reasons that will be apparent as we advance, that besides our own farming, we have more than twenty other farmers working for us, in the production of some special crop, the farms being widely scattered, which furnishes a broad field for observation. From a very intimate acquaintance with agriculturists and horticulturists, having made the business a study, both from the economic and æsthetic side, I am compelled to say that there is not a branch of industry in the land where there is so much business done in an unbusiness like way as there is in these pursuits. There is not one farmer in a thousand that can approximate the cost of a single crop he cultivates, or knows whether he can afford to grow any given crop or not. Should our merchants or manufacturers be as indifferent in details as the farmer, not one in a thousand could escape bankruptcy for a year. But this is a digression, as I do not intend saying one word about *financial* profits, except incidentally.

Taking it for granted all present are tillers of the soil, and depending upon the productions of your farms for your support and for all the luxuries this life affords, the question naturally arises, How shall we make our farms yield a satisfactory profit on our investment and a suitable reward for our labor, and at the same time derive as much pleasure from our industries as can be found in other pursuits? In all business operations pleasure and profit are proportionate; that which affords the greatest profit affords the greatest pleasure. Farming to be pleasant must be profitable, and if profitable must be pleasant.

In reply we would say, the most profitable industry the farm affords is the development of character, of manhood in your boys and womanhood in your girls. No farmer ever raised a crop half so valuable as a large number of sons—honest, intelligent, industrious, fond of home and all its endearing associations, avoiding, as though a crime, the race-course, the dram-shop, the gambling-den and allied places of infamy. The richest mother is the one that has the largest number of affectionate daughters; daughters that know of no place so dear as home and no name so sweet as that of mother. Here let me say that I am a farmer simply because the farm affords more real pleasure than any other pursuit for which I am fitted. My pleasures do not evolve from what I make from the farm, but from what the farm makes of me. I do not cultivate cereals, vegetables, fruits or flowers wholly for what they will bring in the market, but rather for what they will make me worth in the market. It is not the number of gladioli, the bushels of corn, or the barrels of apples that I have harvested in the year, but it is the crop of manhood, the yield of domestic happiness, that shows the true productiveness and real profit of the farm.

Your most profitable industry is that of the education of your children, in order that they may make good farmers and good wives of farmers. We do not pretend to say that farmers' sons and daughters are not educated, quite

the reverse; on the contrary, they are educated too much, at least, in the wrong direction; they are educated away from, instead of to the farm. They see nothing but the hardships that labor brings, without any of the beauty there is in all of nature's works. Farmers rarely teach their children that in agricultural pursuits can be found a business both profitable and honorable, and one which, if properly conducted, will afford the greatest opportunity for knowledge to be pleasantly employed; a business in which, if their children shall receive a suitable education and will give it as much study and thought as they will be compelled to apply to become successful in other pursuits, will make for them a more luxurious living, with less care, and afford them more time for pleasant recreation than can be found in any other walk in life.

Where are we to look for the proper education? may be asked. We answer, on the farm and at home. We fully believe there have been a score of young men ruined, in a business way, when sent from home for an education, to every one that has been benefited. The first step toward a useful education is to inoculate the minds of our children with noble thought. Teach your children to think for themselves, and they will be apt to act wisely. If a child gets the impression that there is nothing on the farm but hard work and little money, he will very soon come to the conclusion that he will find an occupation where there is but little work and much money. But let a child learn and feel that home is the pleasantest spot on earth, and that his highest ambition should be to secure one and surround it with all the luxuries that rural life affords, and a useful education has been entered upon. A child should be taught quite as much from the heart as from books. The knowledge he obtains from school alone is usually of a character that draws the mind of the student from agricultural pursuits. His studies are such as tend to so direct his thoughts and feelings that when he leaves school he has no sympathy for the business he is expected to follow for a living.

But it was not my intention to dwell so long on this part of my subject, but rather to call your attention to the pleasures to be found on the farm—pleasures I would that all could enjoy, for there is not a more pitiable object in life than a man following an occupation in which there is no pleasure. Schools are indispensable to the welfare of the community, yet they do not accomplish the purposes for which schools were intended; neither can they until the teachers are taught the importance of thinking as well as of reading. If you desire your children to love farming, let them study the farm and its products—not from books, but from the farm itself. Books exert either a good or a bad influence, as you may will. If you can discriminate, and make an application to your business pursuits of the truths laid down in the book, it will be of great value to you, as the book is but the record of some one's practice and theory. If it feeds you, very well; if it absorbs you, it were better never to have seen it.

The book for every farmer's boy to read is the open book of nature. There

was none ever written that contains one-half of the information, none other half so fascinating, none so perfect and pure. Nature teaches us to dwell as much as possible upon the beautiful and good, and to ignore at all times the evil and the false.

Let us take a single tree for an object lesson and see what it will teach us. Time will not permit of our discussing the phenomena of plant life, and we will only say that vegetable and animal lives in no way differ in principle; there is a perfect analogy between the two. But in order to show you the pleasure there is to be derived from the study of the tree, we would say that all plants possess a real life; they eat, drink, feel and think; they sleep, breathe and secrete—in short, perform all the functions of supply, repair, development and reproduction. The intelligence they manifest in searching for food is simply wonderful, while the actions of climbing plants in search of supports are equally strange. All these wonderful peculiarities of plants are but little seen or appreciated. In fact, not one man in ten ever saw the true roots of a tree, or knows that they are put forth in spring simultaneously with the leaves and are shed with them in autumn.

To make the farm attractive, show the child its attractions; how plants know when there has been a store house of food placed within their reach, and will immediately turn their attention to it. Show how each and every plant takes from the earth and atmosphere different elementary substances, and how they are stored up for our use. Show the child the plant's adaptation to the necessities of other living organisms in the localities where they are indigenous; how that in every locality the animal and plant support and sustain each other, and in the end consume each other. The breath of the ox is the food of the plant upon which he fattens.

How interesting it is to watch the plant industries as they are carried on side by side, each doing its own work wisely and well, and without exciting in the least the envy of its neighbor, and without contention or strife! We see the maple collecting saccharine juices; the pine, rosin; the poppy, opium; the oak, tannin; and so on through the list. In our gardens the aconite collects a deadly poison which it stores up in its tubers, and by its side the potato gathers in starch for the sustenance of man. The plant's adaptation to the soil and climate in which it is to grow is one of the most beautiful and useful studies for the old as well as the young.

The form, variety and extent of the vegetation of a country depend altogether upon the existing elementary substances which they were created to utilize for the benefit of other creations. A remarkable instance of this adaptation is to be found in the *Cinchona calisaya*, a strong, rapid-growing, ornamental evergreen shrub, or low-growing tree, which abounds in the malarial districts of Peru, and which has a world-wide reputation for the medicinal properties contained in its bark. The active principle in the bark of this tree is an alkaloid which abounds in the atmosphere of its native home. The traveler, in passing through the districts where this tree abounds, soon becomes enervated, and in a short time fever-stricken, the

result of inhaling the impure atmosphere of that country, the atmosphere upon which the cinchona subsists, and from which, by a chemical process of its own, it elaborates the valuable medicinal property, an almost universal remedy for malarial fevers. This is one of the strongest proofs of the science of homeopathy. It proves beyond question the Hahnemann theory, *Similia similibus curantur*, not alone because of the fact that this tree abounds in those malarial districts, and stores up in its bark the drug that allays malarial fevers, and which is, besides, so powerful a tonic, but because of the fact that the same tree, planted in situations where malaria does not exist, does not have in its bark any of that active principle known as quinia, one of the forms of which is quinine.

So valuable is the bark of this tree as an article of commerce that its cultivation in other countries, where climate and soil were favorable for its production, has been attempted. Large plantations were made in the south of France, in Spain and in Italy, and in each case the attempt proved a failure, from the fact that the drug in an elementary state did not exist in the soil of its adopted home. The trees grew luxuriantly, but could not yield a product that was not in the atmosphere upon which the plant fed, any more than the metallurgist can extract the precious metals from the rock that does not contain them. The cinchona is now grown in India, where malaria abounds in its most virulent form, and there the tree produces a bark more valuable than that obtained in its native home.

The same principle is applicable to every plant, and under all circumstances. It is the reason why the plum is an abundant crop in a given locality, and why the peach is not, and the reverse. It is the reason why either will thrive for a time in a certain locality, and for a successive period fail; then again thrive, and produce their rich fruits with all their former vigor. It is the reason why the rotation of crops is an agricultural necessity. When one kind of grain, vegetable or fruit has consumed all the food provided for its use it will no longer succeed, and the practical horticulturist wisely accepts the situation and cultivates some other crop.

The pleasures that evolve from the study of plant life can not be overestimated, and a man's pleasures are in all cases true indices of his character; by them you can judge him as truly as you can by his library, or, rather, by the books he reads. If his pleasures are ideal, his character will be beautiful and pure; if he sees only beauty in his occupation, his life will be correspondingly beautiful. Every farm is a store-house of beauty but little seen or appreciated, and it is to one of the many forms of beauty constantly before you that I wish to call your attention. It may furnish some of you rich food for thought, and thought properly applied is the key to every success.

I wish now to call your attention to the flower, its functions, and its importance in the economy of nature as another of the great attractions that horticultural pursuits afford.

Plants in their varied forms, clothed in foliage and adorned with flowers of exquisite shape and color, yielding, as they do, their rich fruits in the most lavish manner, are objects of the greatest interest to the casual as well as to the practical observer. Doubly interesting is plant life to those familiar with its phenomena, or, more properly, with plant physiology, and the study of it is a fund of constant enjoyment to one who clearly sees in these creations the same elementary substances that go to make up our own bodies, and in very nearly the same proportions; how they eat, sleep and secrete; in short, have all the functions for repair, supply, development and the perpetuation of the species. The interest in this study commences, not when we love and admire the flower for its matchless form, its gorgeous colors, its delicious fragrance or its general external appearance, but when we judge the plant as we estimate individual character—not for the casket, but for the jewel it contains; not for its outward appearance, but for its intrinsic worth.

Our time will not permit us to speak of the plant as a living organism, or to view with wonder and admiration the wisdom and power of the Creator as displayed in its different organs and appliances. We admire the roots, with their innumerable tufts of fiber, which, by a marvelous faculty scarcely explicable to us, imbibe the liquids contained in the earth and convey the nourishing fluids into the tubes of the plant; the stems and branches which sustain parts of the plant in mid-air; the leaves, organs at once of respiration and evaporation; the vessels so variable in form; the breathing pores, the cells; the innumerable chemical laboratories the leaf contains; in short, all the living mechanism by means of which the vegetable functions are carried on. Our interest and admiration for the present are centered in the flower; it is to that particular organ, or combination of organs, to which I wish to call your attention, in order to show its important mission in the economy of nature.

What is a flower? This seems a simple question, yet it is a difficult one to answer correctly. Most of us know what a flower is, in part, but its functions are by no means generally known; in fact, the flower itself is not as well known as it is supposed to be, and not infrequently that which we call a flower by common consent, is not a flower, and many undistinguished parts of a plant are, in reality, true flowers. In our remarks we shall avoid botanical and scientific terms as much as possible for the benefit of those who are not familiar with them.

Botanically speaking, a flower is that temporary apparatus, more or less complicated, by means of which fecundation is effected; the essential organs being the stamens and pistil, the former representing the male and the latter the female organs. The floral envelopes or petals, which we regard so beautiful, are by no means necessary for the purposes of reproduction, excepting so far as they act as a protection to the organs of fructification in their early stages of development.

To speak plainly, the flower bears the same relation to the plant as the generative organs do to animal life. Herein we find a striking analogy

between animals and plants. Both are provided with particular organs, which, by their combined mutual influence, concur in producing the most important functions of life. Reproduction is the ultimate object for which nature has created various organs of vegetables and animals, and they exhibit perfect similarity in respect to this great function.

From the action which the male organ exercises upon the female organ, fecundation takes place, by which the embryo, yet in the rudimentary state, receives and preserves the vivifying principle of life. Here, however, we may remark the modifications which nature has impressed upon these two great classes of organized beings. Most animals are, at birth, furnished with the organs which are, at a future period, to effect their reproduction. Those organs remain in a state of torpidity until nature imparts to them a new energy and render them capable of performing the offices for which they were intended. Plants, on the contrary, are, at their first appearance, destitute of sexual organs, these not being developed by nature until the time when they are to be employed for the purpose of fecundation. Another great dissimilarity between animals and plants is that in the former the sexual organs are capable of performing the same functions several times and exist during life, while in plants, which have a soft and delicate texture, these organs have only a temporary existence; they make their appearance for the purpose of accomplishing this important function, fade and disappear when they have performed their office.

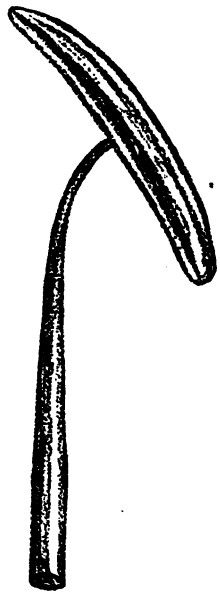

FIG. 1.

With these preliminary remarks, we will now endeavor to show you the manner in which fructification takes place in the flower, or by the agency of the parts of the flower; and in order to do this clearly I have inserted illustrations of the sexual organs of the plant, magnified in some of the figures many thousands of times.

Figure 1 represents the anther of a lily, magnified about twelve times, which, owing to its natural size, is all that is necessary to clearly understand it. It is needless to dwell upon the construction or description of this section, as it would only mystify rather than instruct, besides taking the time which can be much better employed. We therefore say that this organ is merely the receptacle or store-house of the pollen, which contains within it the active principle of fecundation, and bears precisely the same relation to the plant that the semen does to animals. The pollen grain contained in the cells of the antlers generally presents the appearance of fine powder,

and is composed of extremely minute grains. There are a few plants, however, on which the pollen is found in solid masses of various sizes. These masses have thus far defied the powers of vegetable physiologists to analyze; they occur, however, in so few plants that it is not worth our while to notice them. In order to show you how minute these particles of pollen are, it is only necessary to call your attention to your clothing during summer, after you have been taking a walk along some neglected highway, where you come in contact with the ragweed or the golden rod, the pollen of which is so abundant that one's clothing is completely covered with it. These particles of yellow dust, finer than the finest flour or powder of any kind, are by no means single particles, but masses of innumerable particles. And here one of the great mysteries of all created things begins to manifest itself.

These pollen grains, so small that they require to be magnified many thousand times in order to be seen in their individual forms, contain in them all the power for the reproduction of the species that there is in animal life. To be more plain, these minute particles perform the same function, and in almost precisely the same manner, as the semen does in animals for the purposes of reproduction.

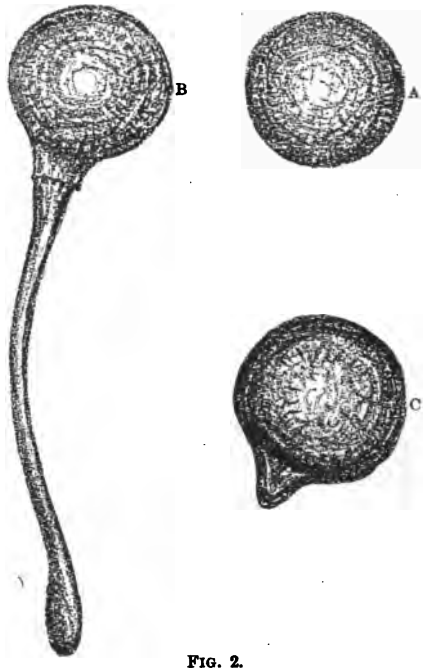

FIG. 2.

The microscopic investigation of the pollen shows quite a variation in their respective forms, as, for instance, some are spherical, others oval in form; some have smooth, others a rough or granulated surface; in some families the pollen is viscous or gummy, in others not. At the same time, each grain of pollen whose form is, as has already been remarked, quite variable, presents a uniform organization. It is composed of two membranes, the external one thicker and furnished with pores, andsometimes with more or less prominent appendages; the internal membranet is thin, transparent, and has no adhesion to the first. When submitted to the action of water the inner membrane swells, the outer bursts at some part of its surface, and through the opening thus formed there issues a tubular prolongation similar to "C," Fig. 2. The part this performs will be shown later on

in our remarks.* We will say, however, at this point, that this membrane is filled with a viscid fluid that is in all respects analogous to the semen secreted by animals, and contains that active principle known as spermatozoa. That which is secreted by the female organ of the plant can easily be collected in sufficient quantities for chemical analysis, and was by Prof. Needham, who made it in the most careful manner, with all the improved appliances, and could not discover the slightest difference between the secretions of the plant and the seminal secretions of the animal.

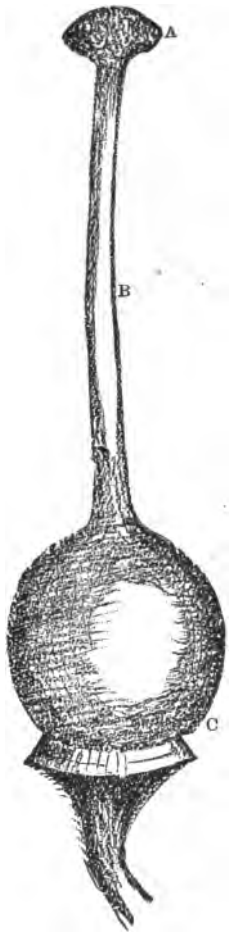

FIG. 3.

The pollen of most plants is of a most inflammable character; when thrown on a red-hot surface it, in many cases, will ignite as quickly as gunpowder. Artificial lightning was formerly produced on the theatrical stage by throwing the pollen grains of the lycopodium or club-mosses on a hot shovel. In many plants it diffuses an odor bearing the most striking resemblance to the seminal emissions of animals. This peculiarity is very distinctly observed in the chestnut, barbary and ailanthus.

That the stamen is only the home in which the male organ, or quite as porperly, the male plant lives, and that each grain is a distinct and individual character, not all dependent for its existence upon the plant on which it is found, may be proved by the fact that the pollen may be kept in a sealed paper or vial for many months without losing its vitality. Many instances are recorded where hybrids have been produced between plants growing on different continents, by collecting the pollen from a plant growing on the one and taking it to the other, where it can be kept in readiness to apply at the proper time.

Our next consideration will be of the pistil, or female organ of the plant, Fig. 3.

As we advance in the study of the organic parts of plants, it will be observed that nature is constantly approaching her essential object, the propagation and preservation of the species. The pistil is the essential organ in the reproduction of plants. Nature has, therefore, taken care to collect around it all possible means for its protection and defense, and herein lies the true beauty of the flower, which must be known to be fully appreciated. The pistil is placed in the centre, sheltered

* Figures A, B and C show the successive stages through which the pollen passes when the *pollen-tube* is thrown out at the moment of fecundation.

under several concentric coverings, and defended besides externally by the filaments of the stamens, which form a guard around it. These various floral envelopes and appendages last as long as the pistil needs their protection and shelter and disappear as soon as fecundation is effected. The pistil of the plant, though varying somewhat in size and shape, has the same organs and performs the same functions as the female sexual organs of animals.

Three parts are observable in the pistil, as will be seen by the illustration, "A" the stigma, "B" the style, and "C" the ovary.

The stigma is the usually glandular part of the pistil, placed at the summit or style, and destined to receive the influence of the fecundating substance; its surface is generally uneven, and more or less clammy. The stigma, considered in an anatomical point of view, is composed of elongated utricles or bladders converging from the surface toward the style, and are loosely attached to each other by a mucilaginous substance. This will be shown more plainly as we advance.

The style is a filiform or thread-like prolongation of the ovary, connecting the stigma.

The ovary is the same in the plant as in the animal, which completes the chain of analogy.

We now come to the most remarkable and interesting phenomena in plant life, viz., fecundation.

When the existence of sexual differences in plants was first propounded the discovery produced general astonishment. If the most convincing proofs had not established it, if the more common observation had not allowed every one to verify its reality, it would certainly have been classed among the wildest and most singular inventions that ever evolved from a poet's imagination. But the proofs were convincing. The demonstration of the existence of sexual organs in plants became a brilliant and unexpected fact, elevating at once the plant to a higher sphere in creation as its analogy with the animal became closer, filling up, in part, the gulf which had hitherto existed between the two great classes of organic life, and yielding an inexhaustible fund for reflection and comparison to naturalists and other thinking men.

Upon this subject the ancients had very vague but practical ideas. We learn from Herodotus that in his time the Babylonians already distinguished two sorts of date palms; they sprinkled the pollen of one on the flower of the other to secure the production of fruit of that valuable tree.

An Italian botanist, in the sixteenth century, was the first to proclaim the fact that the productive trees were the female ones and the sterile the males. He did not, however, do much toward the development of his theories, and it was not until 1694, when Camerarius, a German botanist, showed the precise use of the two essential parts of the flower, and the part that each one played in fecundation, that the existence of sexual organs in plants became an established fact. This discovery made a most wonderful impression on the minds of naturalists. The theory was fiercely combated on the one hand,

and most ably defended on the other. This scientific and intellectual warfare did not die out until 1735, when the celebrated Swedish botanist, Linnæus, rendered it popular by basing on the sexual characteristics of plants his vast and admirable system of classification. From that date all opposition to the theory of sexual relations in plants ceaesd, and it became an established scientific fact.

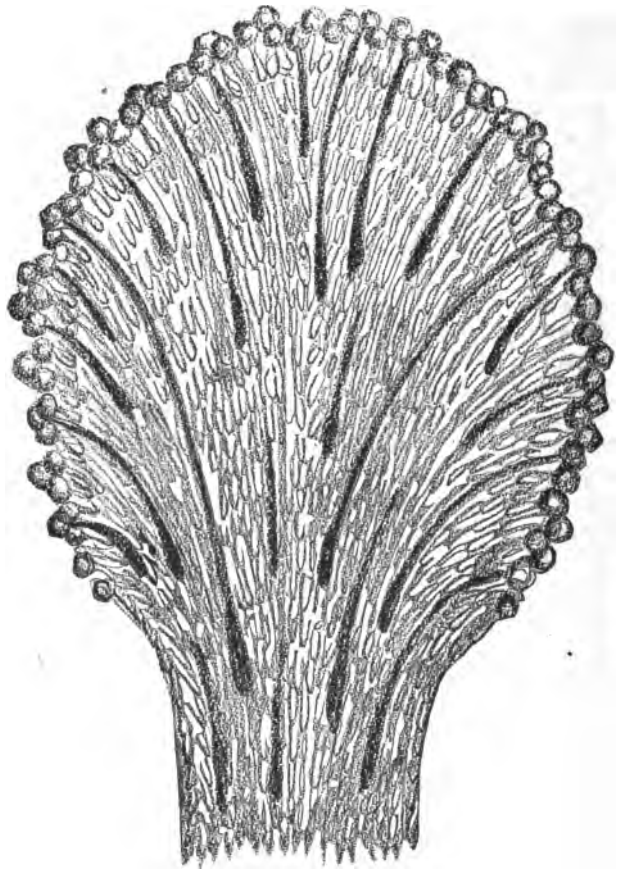

FIG. 4.

The pollen having been recognized as the matter which fecundates the ovary, the next thought was, what are its mechanical operations? It was first supposed that the grains of pollen simply opened, and that the granules which they contained, being absorbed by the stigma, went to form the embryo, or concurred in its formation. Constant observation soon convinced

some of the most scientific botanists that a much more complicated process takes place. In 1823 Amici, an Italian natural philosopher, while observing the African purslane tree, perceived that the grains of pollen, far from opening on the stigma, as was thought, in order to pour out the fecundating matter, changed by degrees into a sort of membraneous tube, as will be

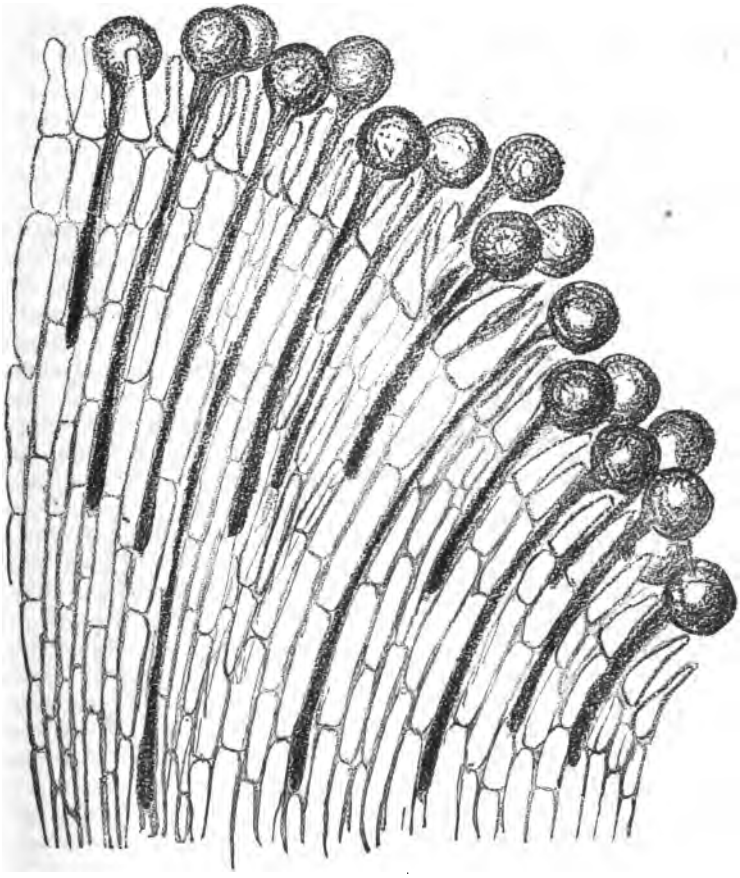

FIG. 5.

seen by the figure C, Fig. 2, which shows the successive stages through which the pollen passes when the pollen tube is thrown out at the moment of fecundation.

Soon after this announcement the celebrated botanist, Brongniart, turned his attention to this discovery, and soon found that the fact recorded by Amici occurred in many, if not in all, other plants; he observed, also, that the pollen tubes generally penetrated, more or less, into the style. He in-

stanced the datura (henbane) as one of those plants in which the action of the pollen on the stigma is very observable. Modern observation has proved most conclusively that the same principle holds good with all plants, and that fecundation is effected in precisely the same manner with all plants. We therefore use Brongniart's figures to illustrate this wonderful phenomenon.

Fig. 4 represents a vertical section of a stigma of datura, showing the tubular sacs after fecundation, the pollen tubes running through all its

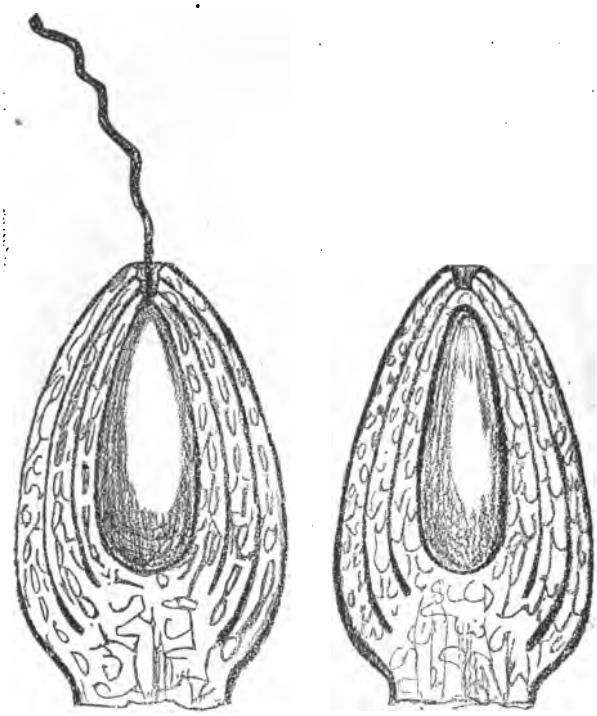

FIG. 6.

thicknesses. These tubular sacs are for the most part already filled with granules (grains of pollen), and are easily distinguished from the tissue of the stigma by their brownish color and opacity. In referring to this figure Brongniart says: "I could not find a better comparison for one of these stigmata than a pin-cushion entirely filled with pins stuck into it up to the head." You will understand the extent to which this has been magnified when I tell you that the whole stigma is not half as large as one of the pollen grains here represented.

Fig. 5 is intended to show the same arrangement in the same plants still

more strongly magnified. The grains of pollen and the pollen tubes are still more enlarged, the better to show the passage of the tube through the substance of the stigma.

These pollen tubes elongate themselves by a most remarkable vegetative process, insinuating themselves into the interstices of the cellular tissue, which has been designated from this cause the conducting tissue, and that, doubtless, by which it is nourished.

Occupying the center of the style, this tube traverses its whole length, entering into the ovary, as is shown by Fig. 6, and is there brought into contact with the ovules.

To simplify this statement, let us say that these pollen tubes enter through the folds, as they may be termed, of the female organ in precisely the same manner as sexual intercourse in all animals is effected. That active principle of reproduction known as spermatozoa must be as systematically conveyed in the vegetable as in the animal life. The birth of a seed is not the result of accident, but the effect of a wisely ordained cause. Every single seed produced on a plant is the result of a separate and independent impregnation. One pollen grain representing a male plant impregnates but one womb, which in its turn contains but a single seed.

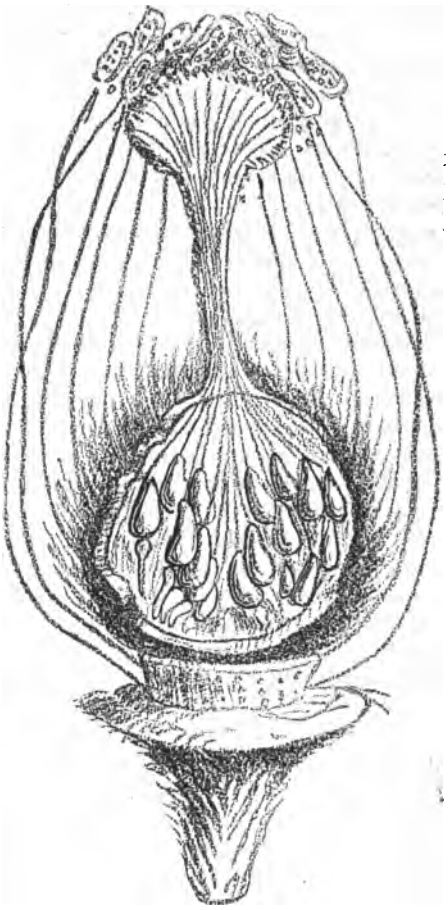

FIG. 7.

This is shown more plainly by Fig. 7, which illustrates a section of the male and female organs entire, and is intended to point out the long course followed by the pollen tubes in penetrating from the stigma to the interior of the ovary, where each of them comes in contact with the ovules.

If you wish to fully appreciate the harmonies of nature, to understand the precision and care that are exercised for the propagation of the species, you

can have no more beautiful or interesting study than is to be found in our corn-fields. You all know very well that if the pollen grain that is formed on the tassel does not fall upon the silk there will be no corn upon the cob; that is, if a single silk is missed there will be a vacancy in the family circle. Each silk—which bears the same relation to the corn plant that the vagina does to animal forms—receives the pollen grain upon its stigma, and conducts it through its entire length to the ovules, so systematically arranged on the cob, the home of this colony of plants.

While the corn furnishes us with a most interesting study in the phenomena of plant life, our interest becomes absorbed in wonder when we examine the tobacco, the petunia and other allied plants. A capsule of tobacco contains, on an average, 2,500 seeds. In order to produce these there must be 2,500 impregnations, all of which are effected within a period not to exceed twenty-four hours, and in a space less than one-sixteenth of an inch in diameter. The style containing this vast number of passages is, in some of the species, nearly two inches in length, and with a diameter not to exceed one-thirty-second part of an inch. Thus we see 2,500 families dwelling together in a space scarcely visible to the naked eye, carrying on in the most perfect manner all the operations essential for the reproduction of the species.

Neither does wonder and admiration cease here. Observation and experiment have proven conclusively that plants discriminate in their selection foi the purposes of reproduction. This theory, or, more properly, principle, in the phenomena of plant life, our time will not permit us to advocate. We can not, however, dismiss this part of our subject without referring to the manner of impregnation by that most singular aquatic plant, the *Vallisneria spirales*, commonly known as eel-grass, and abounding in slow or quiet waters of our rivers, lakes or sea-coasts. It belongs to the class *Diœcia;* that is, the sexes are produced on different plants. The female flowers are solitary, borne on long, slender stalks, finely twisted like a spiral spring. The plant is usually found in water from two to three feet in depth, the flowers being near the root. About the time of the opening of the flower this spiral stem begins to unwind, and this elevates the flowers to the surface of the water, where they fully expand in the open air. The male flowers are produced in great numbers, on short, upright stems, issuing, as we have before said, from different plants. These flowers detach themselves about the time of the expansion of the female flowers, mounting up like little air-bubbles, and suddenly expanding when they reach the surface; then, without regard to wind or current, they float around among the female blossoms, thus bringing the stamens and pistils into immediate contact, and giving the anthers an opportunity of discharging their pollen immediately over the stigma. When impregnation is secured, the uncoiled stalk of the female plant begins again to resume its spiral form, and sinks down, as it gradually rose, to ripen its seeds at the bottom of the water.

But, why, may be asked, this singular method of fertilization? Simply to

carry out a natural law that an intelligent arrangement in the structure of plants has made a necessity, viz., cross-fertilization. There is weighty and abundant evidence that the flowers of most kinds of plants are so constructed that self-fertilization is almost an impossibility, and where plants are so fertilized the penalty of degeneration in the offspring is visibly apparent. There are many methods by which cross-fertilization is secured. It is sometimes insured by the sexes being separated, and in nearly all cases by the pollen and stigma of the same flower being matured at different times. In grasses and the cereals cross-fertilization is insured by the action of the wind. Dr. Keith was the first botanist to observe this singular phenomenon. He says: "As I was accidentally looking at a field of rye-grass, situated to the south of the spot on which I then stood, the atmosphere being clear, and the wind blowing gently from the west, I was surprised to observe a thin and sudden cloud, as if of smoke—a fine dust, sweeping briskly along the surface of the grass and gradually disappearing. This cloud was soon followed by another from a different quarter of the field, and then by a third, and so on in succession for several minutes. It was a general discharge of pollen from thousands of anthers bursting at the same moment, so that no stigma ready to receive the pollen could possibly fail of being supplied, either from the anthers proper of the flowers of which it formed a part, or from those of some other flower discharging their contents into the general mass." This was written long before the fact was known that all flowers were so constructed, that self-fertilization was a rare instance instead of a general law of reproduction. Sprengel, Muller and Darwin, who have given years of unremitting study and observation on the fertilization of flowers, agree upon the general law that no organized being fertilizes itself, excepting in rare instances where the perpetuation of the species would, *without it, be lost.* Or, as Darwin put it, "that nature abhors perpetual self-fertilization, and that in most plants self-fertilization is avoided by special contrivances, or even rendered impossible, or, if it does take place, it is at least injurious."

Thus far I have only alluded to the inanimate causes of cross-fertilization; I will now mention briefly the animate causes, and then make an application in which I think you will all be interested and profited so far as a knowledge of the cause of failure or of deterioration of seed may be useful.

The animate agents of fertilization are, in comparatively few instances, birds; but, as a general rule, insects are the agents employed for this work, and so systematic are they in their operations, so harmoniously do they work together, that the lives of the two classes of organic beings appear a unit.

The insect is allured to the flower, and this, accordingly, appeals to its sight or smell by brilliant colors or attractive scents. These colors and these scents draw the insect to the flower from a distance; but by themselves they would be but empty gratifications, unprofitable to insect and flower alike. Something more substantial must be offered; something that will

prevent the insect from merely loitering about the flower in idle satisfaction, and that will induce it to probe to the recesses of the blossoms, and, in so doing, to transfer the pollen of one flower to the stigma of another. This further allurement is addressed so the palate, and though in some cases it is nothing more than the pollen itself, in most it is supplied by the secretion of a sweet fluid, the so-called nectar.

Now, Nature, who at first sight often appears a prodigal, is always found on closer examination to be the most rigid of economists. If no insects are to be allured, she gives, as we have seen, no nectar; she cuts off the bright petals and suppresses the attractive odors. Nor even when a bait is wanted will she give it one minute sooner than is necessary. The brilliancy, the scent and the nectar are only furnished when the flower is ready for its guests, and requires their presence; just as a thrifty housewife lights her candles when the first guest is at the door. The miniature bud has no such attractions. Still more, even when the flower is mature, when its pollen is ready for transference, or its stigma for fecundation, when all the allurements are consequently displayed, and insects invited to the feast, she still shows her economy. Guests might come who were not of sufficient importance, and the banquet be wasted on them; for it is only when insects have a certain shape, size or weight that she requires their visits, and can use them profitably for her purposes. She requires, moreover, that they shall make their visits by the main portal, which she has specially adapted to suit both their and her own requirements. All insignificant and unremunerative visitors, all such, moreover, as would creep in by a back entrance, must be kept out. Insects of all denominations are but transient visitors, their lives are short; many, if not the most, of the species live no longer than the flower upon which they feed. Each and every species or genera of plants is furnished with an insect for the purposes of cross fertilization, and when the work is accomplished, the life of the plant is wrapped up in the seed and the life of the insect in the chrysalis, where it will remain until required again for the purposes which its creation was intended to accomplish.

There is a stronger and closer analogy between the sexual organs of animals and plants, which manifests itself in the plant at the time of flowering, to which I will now call your attention. This is the evolution of heat in the female organ of the plant when it is ready for impregnation.

This phenomenon is supposed to exhibit itself in all flowers; there are but few, however, so arranged that any test can be made to satisfactorily demonstrate the fact. The discovery of this singular phenomenon, like many others, was purely accidental. It was first noticed by that celebrated botanist, Brongniart, in examining a flower of the *Colocasia odorata*, a tropical plant grown exclusively in our green-houses for the beauty of its foliage. This plant, he said, at the time of flowering presented an increase of temperature that might almost be compared to an attack of daily fever. These attacks were repeated for six following days with a considerable intensity, and almost at the same hour, commencing at three and lasting until six in

the afternoon. At the second flowering of the plant the greatest precautions were taken, and all known means adopted to test this vital phenomenon. Two very small and accurate thermometers were procured; one was attached to the leaf, the other to the spathe of the flower. For several days both marked the same temperature. At the time of flowering, or just at the proper time for impregnation, the thermometer that was fastened to the female organ of the plant, or rather collection of organs, marked a temperature eleven degrees higher than the one on the other part of the plant. This striking increase of heat took place at 4 P. M., and entirely disappeared during the evening, the temperature of that part of the plant remaining the same as the other until the same hour of the following day, when it rose eight degrees. These changes occurred daily for a period of six days.

This proves, says Professor Morren, that atmospheric influences have not the slightest effect upon the emission or retention of the fragrance. It further proves, in regard to plants exposed to the air, that neither the evaporation of the particles nor the accumulation of them on the parts of the plant where they have their origin is the cause of the periodical absence or recurrence of this exhalation; so that the explanation of this phenomenon must be sought in physiological facts.

Having given this part of plant physiology years of patient, untiring thought, study and observation, the only conclusion I can arrive at is that the fragrance of flowers emanates from their seminal emissions. The emission of odor, commencing with the opening of the flower, is the most powerful at the time of impregnation, and ceases as soon as that object is effected.

At this age of the world opinions are only valuable when sustained by evidence, and the evidence we shall offer to support our theory is of an experimental character. It is a strange fact that many of the experiments made were to establish a very different, though not conflicting, theory; so we apply them to ours without any infringement on their owners' rights. For one of the more interesting experiments, which we think fully establishes our theory, we are again indebted to Professor Morren. The flower of the *Maxillaria aromataca* is well known to all orchid growers for its strong odor of cinnamon; so powerful is it that two or three flowers will scent a whole conservatory. It is also well known that in the fertilization of orchidaceous plants the deposition of the pollen on the stigma is effected very quickly; that the pollen tubes elongate in less than an hour, and the organs of reproduction have accomplished their mission.

It is also a singular fact that in that class of plants impregnation is never effected excepting by the aid of insects or by the hands of the orchid-grower. Professor Morren fertilized a large number of these flowers; in each and every case the fertilized flowers lost their fragrance in less than half an hour after the operation, and never again showed signs of it. An equal number of flowers were prevented from becoming fertilized, and they emitted their powerful odor day and night, morning and evening, for a period of eight days, when the flowers withered and fell. The amount of time prevents us

from speaking of our own experiments, all of which were equally convincing and interesting.

I have said this much to show you how much pleasure there may be derived from rural pursuits when properly directed. There is not a blade of grass, a plant of any kind, but which furnishes food for thought or is loaded with instruction. The study of plants is more fascinating than any pleasure to be found away from the farm; but it must be taught aright. Show our children the beautiful there is in the plant, and they will never see the work that it costs to produce it. On the contrary, show them the work first, and they will never behold the beautiful, but will leave rural pursuits for others requiring less labor and care without the certainty of a competence in life, and with it independence and contentment.

We can not continue this subject further, there being a limit to time and patience. Besides, we think we have said enough to show plainly the vast amount of pleasure that may be derived from horticultural pursuits. From our own experience as a farmer, we would say to any young man, if you are looking for pleasure, look over the farm; if for an honorable occupation, stick to the farm; if you wish to be included in the list of scientists, examine well the bees, bugs, birds, blossoms and bowlders that you meet at every step, each and every one of which will teach you lessons that will confound the wisest of men; if you are looking for a happy home, turn not away from the farm; if you desire to live rich, and to secure sufficient competence to make your old age contented and comfortable, live on the farm. The town may have its allurements and attractions, but nowhere will the true blessings of life be so abundant as in the home of the intelligent farmer.

In conclusion, allow me to quote from a book by Coultas, entitled "What May Be Learned From a Tree"—a book that every tiller of the soil should have:

"If you wish for peace and contentment of mind, study nature. You will be brought into communion with the infinite and the eternal. You will become temperate in your desires. You will love truth and righteousness. The contemplation of this majestic system of continuous and eternal change will give loftiness to your thoughts; free your mind from a groveling and ignorant superstition; give you just, confiding, worthy views of your Creator, and enable you to march through life with a firm, with a manly step. This world is full of beauty but little understood or appreciated. An overflowing goodness has covered the earth with flowers and glorious forest trees, yet how few, comparatively speaking, care to know anything about them! We invite you to this grand and ancient library; to the study of these volumes overflowing with wisdom and instruction. It is not the mere study of nature, but the impressive lessons which she teaches. Thoughts of infinitude and eternity come to me from the distant stars and from the forms of vanished life laid up in the rocks, reminding me that my own life is fleeting and evanescent as the vapor of morning. The lofty tree, with its wealth of branches and foliage, perishes alike with one of the lowly, undistinguished

blades of grass which it overshadows; so none are so high or well known but they shall erelong lie low and be forgotten. And herein are seen the wisdom and equity of the arrangements of nature that all must submit to the same great laws of decay and dissolution. She shows, in this respect, no partiality. Superior talent, energy or social position may for awhile elevate some fragments of humanity above their fellows, but all in the end are reduced to the same level."

THE RELATIVE HARDINESS OF SEEDLINGS AND BUDDED OR GRAFTED TREES.

BY G. C. BRACKETT, OF KANSAS.

Since the disastrous effects of the extreme low temperature during the winters of 1884–5 and 1886 upon the fruit orchards in many of the States, the question of *hardiness* of stock and varieties has received much attention from persons prominently before the public as leaders in the pursuit of fruit culture, and opinions have been given to the public as to the best means for preventing a re-occurrence of such a calamity, and among the leading recommendations have been the use of a certain class of seedling stocks, and certain methods of propagating varieties, as securing a greater hardihood to the tree.

Let us first consider the seedling theory. What are seedlings? They are plants developed under nature's process in propagating a species by seeds. Next, what are seeds? First a simple plant cell, then by development a plant germ, and when fully perfected an embryo plant folded within a seed-coat. They are very similar to a simple bud, such as may be found on any branch of a tree, the scales of which correspond to the coats inclosing the seed. Seeds are generally the result of chance and promiscuous fertilization, being from the influence of surrounding trees and of different varieties. These will reproduce true to their species; that is, an apple seed will produce an apple tree, a peach pit a peach tree, and so on through every species; but there will be a variation from the parent in some one or more features—either in the form of the tree, leaf, or their fruit—slight in some, and very marked in others.

Of the millions of apple seeds planted within the past century, history records but one Baldwin, one Ben Davis, and only one of the thousands of varieties known and catalogued.

It is true there are a few instances wherein the seedling possesses many traces of the parent, and might be, for all practical purposes, accepted as a reproduction of the parent, as in some varieties of peaches, viz.: the Heath Cling, Snow, etc.; but a critical examination of these will disclose a variation in some part of their structure. I believe it safe to say that an exact reproduction of any known variety of our fruits has never been obtained; and it

would seem wholly impracticable to attempt it, as it would require a repetition of the exact conditions and influences which produced the seed from which the parent was developed—attainments beyond the conception and powers of man. And it might truly be said nature never designed there should be a reproduction. Such being the result of seed propagation as relating to the fruit product, is it not reasonably conclusive that the physical properties of the tree are also varied by the diversified influences of fertilization, and that there will be all the degrees of physical endurance, from tender to extreme hardiness? Ample evidence of this may be found in any large plantation of seedlings. Furthermore, seeds may be selected from known hardy sorts, and planted on as nearly the same character of land and location, and treated with the same care, as possible, and after a severe cold winter or an extreme high temperature in summer may be seen here and there in the rows the varied conditions of constitutional weakness or power to resist debilitating influences, and feeble and hardy trees will be found standing side by side.

It is not an uncommon occurrence to find in an apple orchard the sprouts starting from the roots of the tree upon which the graft had been worked entirely killed to the ground, while the top formed from the graft had escaped injury. Also, in the case of pear blight, sprouts from the seedling root are frequently attacked by this disease, while the top formed from the bud or graft escapes. So, also, is the reverse true, where the top may be entirely killed, and a sprout from below the graft will pass through the same influences unharmed.

The parent producing the seed may be "as hardy as an oak," and yet such results may follow in its progeny as are here cited, which are familiar to every nurseryman and orchardist.

I will cite an incident, occurring upon my own farm, which was interesting to me, because it clearly demonstrated the point here discussed. In the spring of 1885, I planted one thousand root-grafts, worked with the Ben Davis, a variety considered the type of hardiness. These were set in two parallel rows, four feet apart. Their growth during the season was fairly good, and well matured at the commencement of winter. The following spring (1886) I noticed here and there in the rows trees that did not leaf out. By an examination, I found the tops were apparently sound, but inactive. Others partially leafed out, while scattered among them were trees that had made several inches of new growth. I pulled up quite a number of the leafless and inactive ones, and found their roots were dead to the line where the graft had been inserted, while all the wood above was alive and uninjured. The injury could not have resulted from any local cause, as often the damaged tree stood within six inches of a healthy and vigorously growing one.

(I send you samples of the damaged trees for examination. You may discover a pointer to the cause of the disease known as "root rot," as well as evidence in support of the unreliability of seedlings, as they show every feature in top and root found in trees destroyed by that disease).

With such evidence before us as to reliability of seedlings when used as stocks, what reason is there for a belief that the unworked tree would be any the more hardy?

There is no certainty of any tree being hardy until it has passed the ordeals of climate—been tried and proven—and the propagation of hardy sorts does not always carry with it the hardiness of the parent. This is noticeable in almost every orchard, where death occurs to a tree in the midst of others which survive the influences common to all, and the destruction may begin at the root or in the top, just as the powers of resistance may be lacking in either. Trees are hardy in one location, because the conditions surrounding them are congenial, and the same may be, and often are, tender when grown in other localities, and this result is liable to develop in the product of seeds selected from trees proven to be hardy in one locality when planted in another.

Secondly: It is claimed that the process of propagation by grafting and budding weakens the constitution, and hence the hardiness is lessened. As to the safer method of the two in their tendencies, I can see no difference, and their preference is only a matter of convenience and adaptation to the requirements of the class of stocks to be worked. From a physiological point, either is in harmony with natural principles, and is simply a union effected between two sections of live wood by the aid of cellular action, which performs itself in like manner to growth in the extension of a root or branch or the general enlargement of a plant. If the process is properly performed, and while the stock is small, the union becomes complete; the circulation will pass through the union as freely as in other parts, and nature will continue enlarging and building up the structure by the addition of annual layers over this part as in all others.

The process of propagating many classes of plants by cuttings and layering is conducted on the same principle, and does not excite the question of hardiness.

Says the late Dr. Warder, "A graft is nothing more than a cutting helped, and if a plant grown from a cutting is hardy, why should its growth be any the less so when helped by being inserted into a tree or root?"

If the tree from which the buds or scions are taken is known to be hardy, and they are worked on known hardy stocks, then there is no reason for doubt that such propagated trees will be hardy also. But when the propagation is worked on stocks grown from a lot of promiscuous seeds, then there is no reliability in their hardihood, as the term "seedling" does not imply any certain hardiness in a plant. The Roxbury Russet, Rhode Island Greening, Baldwin, and hundreds of others, have been handed down through generations by these methods, repeated thousands upon thousands of times, and are to-day not true in kind, but as healthy in tree, considering locality, as at any time during their existence. Orchards of budded and grafted trees do fail. So also do seedling orchards. Is it because they are seedlings?

If the foregoing positions are true, and practical results seem to support

them, then the budded or grafted tree is surest to use, as that portion which is the most uncertain when planted is protected by the ground from the extreme and trying conditions of climate. Too much weight attaches to methods of propagation as the cause of orchards failing. The influences of climate, character of soil, locality and injudicious treatment tend more to produce early decay than any other cause, and to these should be directed our earnest attention and careful study, if we desire to secure the highest success to the fruit growing interest.

WHAT AND WHERE SHALL WE PLANT?

BY A. C. HAMMOND, OF ILLINOIS.

It is an exceedingly difficult matter to prepare a paper of this kind for a society that covers so large an extent of territory as the American Horticultural Society that will be applicable to its great diversity of soil and climate, and in discussing this question I shall be understood as referring principally to the great prairie region of the Northwest.

But, asks the discouraged orchardist, as he views the blackened wreck of his once fruitful trees, and contemplates the balance on the wrong side of his bank account, caused by the low price received for his fruit, why plant at all when prices are below the cost of production? Better devote time and energy to raising grain, hay and stock.

It is true that our orchards are in a deplorable condition. In some States from fifty to seventy-five per cent. of the trees are dead or dying, and a considerable portion of those reported healthy will break down under the first full crop. It is also true that prices have been ruinously low, but no lower than of grain, hay and other farm products. All departments of business are "out of joint;" but time, the great equalizer, will soon correct these evils, and the products of the orchard, as well as of the farm and factory, will, with renewed business prosperity, bring their true value.

We therefore advise renewed planting. Study the principle of adaptation, the peculiarity of variety, soil and situation. Select such varieties and such a site as will meet those peculiarities, and remember that the question of hardiness is governed largely by conditions, and you are on the high road to success.

In the outset the question presents itself,

WHAT SHALL WE PLANT?

And to solve the question it will be necessary to use our best judgment and invoke every possible aid. To present a list for the diversified soil and climate of the great Northwest would be worse than useless, much more so for the entire territory covered by this Society; but some general principles may be laid down that will be suggestive, if nothing more.

North of the forty-first parallel the question of hardiness is of pre-eminent importance, and, while I hold to the opinion that if the tree goes into the winter with well-ripened wood and otherwise in good condition it will endure from thirty-four to thirty-six degrees below zero without material injury, yet the facts are that winter does not always find them in that condition, and it is therefore necessary to look for a race of trees capable of enduring the arctic blasts that sweep down from the ice-fields of the north, even under unfavorable circumstances.

Prof. Budd and Mr. Gibbs have done a grand work for this section by introducing a hardy race of apples from the north of Europe, and generations yet unborn will "rise up and call them blessed;" but we regret to see a disposition to adopt these foreigners to the neglect of those "to the manner born." My experience with Wealthy leads me to believe that it will endure as low a temperature as any of the Russians, while the quality of the fruit is better. Salome is a seedling of Northern Illinois. It has a thick, heavy leaf, and is, to all appearances, as hardy as an oak. The fruit is better in quality and keeps longer than any Russians I am acquainted with, and it should be extensively planted in the North. Whitney's No. 20 is too well known to need any description. It compares favorably in quality with the Russians, and will live and thrive as far north as apples are grown. These varieties may be grown with safety, as well as those of the grade of hardiness of Pewaukee, Walbridge, Mann and Wolf River, if precaution is taken to supply the necessary conditions of nutrition and moisture during the drouths of summer.

The hot, dry climate south of the parallel above mentioned is not suited to the Siberian and Russian races, and it is not probable that they will be of any value there. The Duchess and Red Astrachan—two of our best known Russians—are supposed by many to succeed in all portions of our country, while the facts are that south of this line the Duchess, at fifteen or twenty years of age, produces small, knotty, worthless fruit; and the Red Astrachan, at the same age, is breaking down under half a crop.

Our first orchards were, of course, planted with Eastern trees, but it required but a few years' experience to prove that the favorite Eastern varieties were unsuited to the soil and climate of the Northwest; and just as this discovery was made the Ben Davis came into the arena, and proved to be so hardy and productive, and the fruit so handsome and salable, that it at once became the leading variety over a very large extent of territory. But the unprecedented cold of the last four winters has been so destructive to this tree that many now refuse to plant it. As every orchardist knows, it has a peculiar root development, being furnished with a great abundance of small fibrous and very few long rambling roots. It is not, therefore, capable of reaching out as far as other trees for the moisture and nutriment it needs to perfect wood growth, sustain the proper function of the leaves, and ripen its enormous crop of fruit. We therefore often see an orchard of this variety in September and October with the leaves gone and the trees a perfect pyr-

amid of crimson fruit. This process is, of course, a blow at the vitality of the tree, and unfits it to endure the low temperature that follows. The trees die, and we wisely talk about the variety running out or becoming tender, while it is evident to the observing man that it is so exhausted by the effort to ripen its fruit without being aided by extra feeding or cultivation that, like the overworked, half-fed horse, it died from exhaustion and starvation.

The great drawback to successful orcharding in the Northwest is hot, drouthy summers, rather than cold winters; hence the necessity for careful, intelligent cultivation. To produce hardy trees, capable of enduring our continental winters, a healthy, regular growth must be maintained throughout the entire season, which will enable the wood to ripen up naturally, and obviate all danger of second growth, and consequently of winter killing, under ordinary circumstances.

Every farmer knows that if his corn-field possesses a high degree of fertility and is thoroughly pulverized and cultivated, he will have a crop, notwithstanding the drouth. The same principle holds good in the orchard. If the soil possesses the proper degree of fertility, and is well pulverized and cultivated, the moisture will be brought up from below by capillary attraction; the fine particles of earth will also permit the air to enter, which, coming in contact with the cooler soil, leaves a portion of its moisture.

After an orchard comes into bearing, nothing but the fruit should be taken from the ground. The worst possible management is to annually mow and remove a crop of hay. I have found it an excellent plan to sow to rye about the middle of August, and about the first of June to plow it under and cultivate well with the pulverizer or harrow until August, when the same process of sowing rye may be repeated. After following this plan two or three years, the orchard may be sown to clover, which should be mown and left on the ground. In a year or two it will begin to fail, when it may be again plowed up and sown to rye. By this means the necessary conditions of fertility and moisture will be maintained to produce a normal growth, which will ripen up at the proper time.

Time will not permit of an extended discussion of the new theory of flat, moist orchard sites, but I think every intelligent farmer and orchardist in the prairie region will agree with me, that the condition of our soil has greatly changed in the last thirty years. Then the high, rolling land was fresh and full of vegetable matter, which absorbed and retained moisture like a sponge, and much of the low, flat prairie was covered with water nine or ten months in the year, and supposed to be an irreclaimable swamp; but a third of a century has changed all these conditions, and we now find that constant cropping, without any return, and the washing of the soil, which ceaseless culture has allowed, has so impoverished this rolling land that our summer drouths cause it to become so hard and dry that fruit trees are compelled to ripen up their wood in July or August.

Our drouths are often followed by warm, wet weather, which again forces the sap into circulation and a new growth is started. The trees are caught

in this condition by a severe cold snap, freezing the sap, which ruptures the cells and loosens the bark on the trunk, seriously injuring and often killing them. On low, flat land the soil is deeper and stronger and has lost nothing by washing; and where the water once stood within two feet of the surface the year round, it will now require an excavation of twelve or fifteen feet to reach the water level. If it is conceded (as I think it almost universally is by intelligent horticulturists) that fruit trees suffer more from drouth and starvation than any other cause, it will be readily seen why the low, moist land, that thirty years ago was supposed to be almost worthless for agricultural and especially horticultural purposes, is now the very paradise of fruit trees.

While experience and observation has convinced me that water may stand around trees for some days without injury, and that where one tree is killed by wet feet, fifty succumb to "the inevitable" by the starvation and dry weather route, yet I would thoroughly drain, if for no other reason than to improve the mechanical condition of the soil. But, whatever the location, a regular and well-defined system of fertilization and constant and careful cultivation is necessary to success. It is now well understood that trees and plants take a considerable portion of their food from the atmosphere, either through the leaves, or by being retained in the finely pulverized soil and taken up by the spongioles of the roots; and orchards kept in this condition will, notwithstanding the severest drouth, make a normal growth, which will, in all ordinary cases, prevent injury by cold winters.

TO RECAPITULATE.

South of the 41st degree the primary cause of the destruction of apple trees is not cold, but abnormal and unfavorable conditions. I would, therefore, advise planting the varieties that have, in years past, given the best results, without much regard to the question of hardiness, whether they be Ben Davis, Winesap, Rome Beauty, Janet, Willow, or something not so well known, and overcome these conditions by fertilization and careful cultivation during the hot, dry months of June, July and August. Further north the question of hardiness is one of more importance, and only Russians, or native varieties of unusual power of endurance, can be planted with safety. Plant those that have been known to succeed under favorable conditions, and we will yet make them succeed under unfavorable conditions. Study well the principle of adaptation; the relation of varieties to soil, moisture and cultivation, and this great empire of the Northwest will yet become as noted for its fruit as it is now for its wheat and corn.

CULTIVATION OF THE OLIVE IN CALIFORNIA.

BY FRANK A. KIMBALL, OF CALIFORNIA.

The written history of the olive tree antedates that of any other representative of the earth's flora, and during all the ages which have come and gone since its first mention I find no record of its extended distribution. I

therefore conclude that no other plant so necessary for the wants of man is so restricted in its area of profitable cultivation. This clearly points to the fact that wherever it can be successfully cultivated no other tree can equal it in profit.

Writers entitled to high consideration claim that the olive is indigenous to Europe, Asia and North America. The weight of evidence, however, seems to locate its nativity in Western Asia, from which point, along the natural channels of commerce, it has been transplanted into various sections of Southern Europe, over which it has spread wherever physical and climatic conditions have made its cultivation profitable; so that now there may be added to its most ancient home—Asia Minor and Syria—Spain, Italy, the islands of the Mediterranean sea, the Greek archipelago, and the northern coast of Africa from Morocco to the borders of Egypt. All of the olive-oil of commerce is derived from these sources, but by far the larger portion from Italy alone, Lucca and Tuscany furnishing oil most in request. The most southern provinces of France may be considered the northern limit of profitable olive culture.

The hardiness of the olive secures to it a prolonged existence; in fact, it may be said to "live forever." There is now growing in Pescio, Italy, an olive tree more than seven hundred years old. From all historical reference to this tree, we know that it was held in high esteem by the ancients, and was considered as an emblem of peace.

In Europe the olive tree rarely exceeds twenty feet in height, and is described as a wide-branching tree, with lance-shaped leaves about three inches long, of a pale green color, smooth and glossy on the upper surface, while the under side exposes a hoary surface. Flowers are projected on erect or pendulous racemes; the fruit ellipsoidal and pendulous.

The fruit is a plum, three-quarters to one inch in length and about one-half to three-quarters of an inch in diameter, in color deep violet or quite black, when fully ripe; flesh—which contains the oil—is nearly white in color, and very soft, covering an oblong, cylindrical, pointed and somewhat rough nut, exceedingly hard in texture and nearly solid. The germ of the future plant occupies a very small space.

In 1755 the olive was introduced into South Carolina, and planted near Charleston. Subsequently (1829) Mr. Robert Chisholm planted olive pits, and raised plants, which are now vigorous trees. In 1769 it was brought to Florida by a colony of Greeks and Minorcans, but from various causes proved a failure.

Soil, climatic conditions and latitude favor the introduction of the olive into several of the Atlantic sea-board and gulf States. The cultivation of the olive in California dates from a period immediately subsequent to the establishment of the first Jesuit Mission on the Pacific coast, which was founded in 1769, at a point about six miles northeasterly from the bay of San Diego. From this point all the stock for planting has been obtained, if I may except the few trees and cuttings which have been imported for experimental pur-

poses. Now there are to be seen olive groves scattered at intervals all along the coast from two hundred miles south to a point nearly five hundred miles north of the original grove.

In all this range of latitude, with suitable soil and exposure, the olive can be produced profitably, while the highest degree of perfection attainable is probably reached within reasonable limits from the first planting. In 1869, when this orchard was a century old, I counted three hundred and forty-seven trees at the Old Mission of San Diego, and not a single perfect specimen could be found—a large number having been burned to a greater or less extent by camp fires while the Mission was occupied by United States soldiers at the close of the war with Mexico. The ancient walls having been broken down, this grove was open on all sides to the incursions of herds of cattle, horses, sheep and goats. Many of the older trees had been cut down and used in the mess-fires of the soldiers; the tops of many others had been cut or broken off and fed to sheep. For so many years had the fruit fallen and decayed, the accumulation of pits was so great that a spade could with difficulty be forced into the ground. The whole grove was overgrown with malva, and this so rank that a man on horseback would be hidden by it; and so full was the ground of holes, made by badgers and other animals, that one almost ran the risk of broken limbs in riding, or even in walking, over it.

This state of things was almost instantly changed when the grove passed into the hands of Thomas Davis, under a lease from the Catholic church; and so profitable did the grove at once become that the lease was terminated for the purpose of securing a larger share of the profits, in which the representative of the church was not successful, and the orchard was again practically abandoned, but not until half of the trees had been denuded of every young and thrifty branch. For years past this grove has been in the hands of those whose "tender mercies are cruel," and it is fast succumbing to the forest of gigantic malva, and to-day the wonder is that there exists a monumental olive tree to mark the spot where Junipero Serra laid the foundation of the first Mission in California.

As late as 1872 not an acre of young olive trees had been planted in San Diego county. Many difficulties were encountered by all those who planted subsequent to that date, as well as by those who experimented during two or three years preceding. All the methods of planting described were tried, and many failures recorded. But the persistent Yankee has surmounted all difficulties and discouragements, and the years 1886–7 will witness the planting of more acres of olive trees than in any similar period since olive culture has been thought of as a profitable industry. Many thousands of olive trees are now in bearing in the counties of San Diego, San Bernardino, Los Angeles, Santa Barbara, Ventura and Santa Clara, and to a less extent in all the coast counties as far north as San Francisco, and in the interior still further north.

The State of California offers great inducements for the cultivation of the

olive. What other fruit-bearing tree will pay all expenses of cultivation the third year, a good income the fourth year, and an independence ever afterward? What other land, and in what other country, will an area of land around which one can walk in less than ten minutes give an independence?

The olive is not a luxury, which hard times may restrict, or perhaps cut off, but it is to become an article of food as common and indispensable as flour or potatoes. Whoever plants a few olive trees around the homestead will, in three years, find his table well supplied with a substitute for meat, at hand at a moment's notice. At ten years from planting, half a dozen trees will produce annually more food than the meat of a good pair of fat steers.

TENACITY OF LIFE.

Search through natural history, as related to the flora of our globe, and there is not found another plant which has such a hold on existence. Of my first nursery planting, in 1870, one cutting showed no signs of growth till late in 1875—except that it was always green—and then sent up a vigorous shoot, which in two years was eight feet high. Many cuttings will not start till the second year, and a few will not strike till the third year.

It is historically true that there are olive groves now in vigorous condition which were planted in the twelfth century. If a tree, through great age or by accident, decays and falls to the ground, at the point of contact a root strikes from it, and, Phœnix-like, a tree rises from its ashes as vigorous as when, centuries before, its ancestor stood almost in the same spot, and fell to earth only to give birth to its natural successor. The tenacity to life and flexibility of character in the olive are only equaled by its indestructibility as a timber tree. Specimens of this timber have been taken from the pyramid of Cheops which were used to dove-tail the great blocks of stone together. These specimens are as sound to-day as when dressed by skilled mechanics two thousand years before the beginning of the christian era. Travelers of high scientific attainments assert that the olive trees now standing on the "Mount of Olives" are the same trees, or from the same roots, as the trees which gave shelter and shade to the little band of christians nearly nineteen hundred years ago.

In Italy there are olive trees eight feet in diameter from which the heart wood has decayed, leaving only a shell of sap wood. These hollow trunks have been filled with stones and cement, by which the trees are kept from falling.

PROPAGATION.

The natural method of reproduction, of course, is through the planting of the pit or stone of the fruit, which is known under the general name of plum. To do this successfully, moisture must be introduced; but this can not be accomplished till the oily pericarp is removed, and the pit placed in water till the oil leaves it and rises to the surface; or they may be put in a bath of weak lye, made from wood ashes; or yeast may be substituted for water, as

first noted; or they may be passed through the digestive organs of birds. None but seeds from the largest and finest specimens should be saved for planting, and of these only a small proportion will grow. An examination will develop the fact that the germs are not perfect. Except for experiment, however, I would not recommend planting the pits.

Another method of propagation is by detaching the suckers, which are thrown out from the trunk of the tree just above or below the surface of the ground; when this is carefully done with a sharp chisel, a good, strong plant may be secured. Those from above ground, having no roots, should be cut back, carefully trimmed, and planted six to eight inches deep. The suckers taken from below the surface are certain to grow, as more or less roots may be secured by care in removal.

In case seeds are planted, grafting must be resorted to, and the usual methods practiced in transmitting variety in other fruits are equally adapted to the olive. Well ripened wood, two years old, should be selected for scions, and as near the diameter of the stock as possible, and if the graft be set in the stock under the surface of the ground a very material advantage will be gained, namely, the graft will put out its own roots, on which the future tree will soon establish itself.

The planting of "truncheons" is advocated by some growers. These may be any length, even eight or ten feet, and of any diameter convenient to handle. The depth to be planted varies, according to the whims of the planter, from one and a half to four feet. Of course it is intended that the truncheon shall be the trunk of the future tree, and with extraordinary care this may be the result; but the tendency of all wood, when exposed to the sun and air, is to become dry. This will be the case with the truncheon, except it be protected both from sun and air during the period required in rooting sufficiently to produce a circulation of sap, to repair waste by evaporation, and to produce growth. The disadvantages of this method are apparent. What would make one truncheon would make ten better cuttings. The formation of a symmetrical tree from this method will be found to require a large amount of patience and perseverance.

The usual and most successful method of propagation is by taking limbs from bearing trees, selecting only those from trees which are the best bearers, cut them in pieces ten inches long, plant in rows two and a half feet apart, and about one foot in the rows, the top of the cutting a little above the surface of the ground. Cuttings may be taken off from January till March, and planted immediately, or if kept cool and moist they need not be planted for months. If allowed to get dry, the sap will turn brown, in which case throw them away.

Another method, sometimes resorted to where a particular variety is required, is by detaching the "ovula," or embryo buds, which may have been forced into woody excresences on the trunk of the tree, usually a few inches above or below the surface of the ground. These embryo buds sometimes entirely surround the trunk of the tree, and look like so many bulbs arti-

ficially attached, and may be detached with a sharp knife, if small, but a safer way is to take a turner's gouge, and with two or three light blows with a mallet they may be secured. These "ovula," or little eggs, are known in technical parlance as "knaurs," and should be treated as bulbs, planted two or three inches deep in nursery or orchard, kept reasonably moist, and the ground well cultivated.

Not an uncommon method of propagation is to take olive limbs and place them in trenches, horizontally, covering them about three to six inches deep with fine soil, or at a less depth if well covered with mulch. These will send up many shoots, which will grow the first season, oftentimes, four or five feet. It is very easy to remove these trees from the nursery, and is done by removing the soil from the space between the canes, so as to expose the limb, and with a saw cut apart, and as the roots all start from the same point as the shoot, no trouble or danger can occur in transplanting.

With ordinary care, all these methods of propagation may be successfully adopted, except the "long truncheon" plan, which is surrounded by more difficulties than any other. Usually a number of shoots start from a cutting. These should be removed while quite small—so small as to be easily rubbed off with the fingers—leaving, at most, two shoots to grow.

I would not plant olive trees in an orchard at a less distance than twenty-five feet apart. The tree grows to a much larger size here than in Europe, where twenty feet is considered a great height for a full grown tree, while here there are many trees towering to a height of forty or fifty feet, with trunks two to three feet in diameter.

CONSIDERED AS AN ECONOMIC PLANT.

To such an extent has this plant become indispensable to man, that Hon. Marshall P. Wilder, Commissioner from the United States to the Universal Exposition in Paris, 1867, after a most exhaustive examination through the olive-producing districts of Southern Europe, in his report to the Senate of the United States, says of this fruit: "It plays a most important part in the domestic economy of Europe. It is not only a source of light, but, to a great extent, of life itself. A large portion of the inhabitants of Southern Europe would perish, were the olive crop to fail."

Thomas Jefferson believed its introduction into Virginia and other Southern States practicable and so desirable that, when in Paris, in 1787, he wrote "that although the olive was the tree the least known in America, it was the most worthy of being known," and "of all the gifts of Heaven to man, next to the most precious;" and concludes by saying: "Having been myself an eye witness to the blessings which this tree sheds on the poor, I never had my wishes so kindled for the introduction of any article of new culture into our own country."

Fifty millions of people look upon the olive as the American does upon wheat, and the failure of a crop is an immeasurable disaster. While the partial or even total failure of a crop of wheat in the United States only

means a temporary change of diet to our people, the failure of the olive crop in Southern Europe means starvation, for there is no other crop to take its place.

As Americans, we to-day may look forward to the time when our country will be as densely populated as the olive-growing sections of Europe—when the possibility of the present food supply is a thing of the past. To what, then, should our attention be turned as the thing of greater importance than "what shall we eat?" Surely, of all subjects, this is of greatest importance. The olive is not now absolutely demanded for food, only as a relish or condiment, and its use as such is prohibitory to its general introduction. It must be utilized as food, and in the same way as in other olive-producing countries. As a strength-producing food, the proposition is settled by centuries of use by millions of people; and to strength, by the same demonstration, is added the question of health.

Outside of its value as a food plant, its products enter into the indispensable requirements of man to a greater extent than does the fruit of any other tree—medicine, surgery, the arts, manufactures, especially that of woolen fabrics of the finer qualities. To such an extent is the oil demanded for the latter purpose that one manufacturing firm in Philadelphia has consumed in a single year no less than 280,000 gallons, which represents the annual product of about 100,000 trees, or more than 1,000 acres. Multiply this by the number of those who use a similar quantity, and an enormous aggregate is found. For all the purposes named, and for all culinary purposes, Europe sends us the oil, the quantity of domestic production being too small to be mentioned.

The many millions of acres in Southern California equally as well adapted to the production of the olive as the most favored section in Southern Europe should be utilized to the extent of domestic consumption; and there is no good reason why we should not export to the same countries from which we draw our supplies, for our trees will have produced four or five crops of fruit before the trees of Southern Europe have bloomed for the first time. All these circumstances favor the largest possible planting of this truly wonderful tree.

Trees in San Diego county have produced 192 gallons at a single crop, and the next succeeding crop 150 gallons of fruit, equal to more than forty gallons of pure oil; and to-day there can not be purchased in the United States a gallon of pure table olive-oil at a less price than $5,00 wholesale.

There are millions of people who in their present locations are barely existing, never knowing anything beyond the enjoyment of the commonest necessaries of life, suffering from winter's cold and summer's heat, who could in a few years surround themselves with luxuries, distributed through the entire year, which the vast wealth of a Vanderbilt would not, in the latitude of New York, procure—and this, too, from an area of ten or twenty acres.

As a wood, it is one of the most beautiful known to the turner's art, and to the cabinet maker a perfect treasure. Before ivory came to be used by

the ancients olivewood was the sculptors' choice from which to carve their divinities. No tree adds greater beauty or attractiveness to the landscape, especially when contrasted with the orange. No tree has fewer enemies, the scale insect being the only one worthy of mention, and this is easily controlled by the ordinary remedies.

The manufacture of olive-oil is a simple operation in its mechanical details, but requires the utmost cleanliness. At the proper stage of ripeness the fruit is picked, and a portion of the water contained is evaporated by drying; or this may be done by leaving the fruit hanging on the tree till it begins to shrivel, which is an indication of the proper condition for pressing. Artificial evaporation is usually resorted to through the ordinary fruit-dryer or evaporator, a heat of about 120° being required for forty-eight hours to prepare for grinding, and pressing must immediately follow; in fact, the whole operation of making oil must be brought to a perfect system. The press must be of capacity to take the crushed fruit from the mill.

The machine for crushing is the same, substantially, as was in use by the ancients, and is constructed by passing a beam through the center of a stone like an ordinary mill-stone, one end of the beam turning on a perpendicular pin, the other end fitted for attaching a horse; and by rolling the stone around in a deep groove, in which the fruit is placed, it is crushed and made ready for the press. The stone may be four or five feet in diameter and six or eight inches thick, and the groove or trough six to seven feet in diameter. The press may be the ordinary cider press of New England or any of the improved presses. Layers of pumice three or four inches thick are separated by slats of wood. Strong cotton or linen cloth is used to contain the pumice. The number of these cheeses is only limited by the power and capacity of the press. From the press the fluid runs off into tanks or reservoirs, where it is left to settle. The separation of fibrous tissue will take place in two or three months, when the oil, which, being lighter, rises to the top, must be carefully drawn off.

The pumice may be reground, after being treated with hot water, and pressed a second time. This will afford a second grade of oil. Fermentation will liberate all the oil which remains, and this may be hastened by the use of hot water in the fermenting tanks. If this latter process is too troublesome, the pumice may be fed to stock, especially hogs, thus utilizing every ounce of the fruit; or it can be burned for fuel. After being drawn off, the oil must be filtered or clarified before bottling. This is effected by passing it through not less than half a dozen vessels, placed one above the other, and kept in position by any convenient arrangement. The bottom of each vessel should be made of tinned wire, and is covered with a layer of cotton batting, so that when the oil passes out of the sixth filter it is ready for bottling. During all the processes the oil should be subjected to light and air as little as possible, nor should the bottled oil be exposed to the light, sunlight tending to rancidity.

The pickling of olives for food is a process exceedingly simple. The best

keeping olives are picked when they are entirely green, put into casks or any kind of vessels (not metal), and covered with water in which has been dissolved one and one-half ounces of the concentrated lye of commerce for each gallon of fruit. The fruit must all be covered with the solution. Let this remain from one to three days, occasionally stirring in such a manner as not to bruise them. After the first twenty-four hours taste them, and see if the bitter principle—lying just under the skin—has been neutralized sufficiently to suit the taste. If so, pour or draw off the spent lye and supply its place with soft water, changing at least once each day till no lye remains. This can be determined by the slippery feel of the water, by its color or taste, or by applying the test of litmus paper—the latter the only sure plan. Should it be found at the end of two days that very much bitterness remains, and the lye appears well spent, pour it off, and apply one ounce of lye to each gallon in the same manner as at first, and in from one to three days' time they will be ready to have fresh water take the place of the lye. When the litmus test determines that the lye has all been removed, cover them entirely from the air with water in which has been dissolved about half a pound of best rock salt to each gallon of olives.

Picked in an entirely green state, the oil of the fruit is undeveloped, and the fruit as food is much less valuable than when picked when partly colored or entirely black—the nearer ripe the more valuable as food—and when so picked and prepared they almost or quite supply the place of meat, and, pound for pound, are equally as hearty and substantial food for the laboring man. The same rules for extracting or neutralizing the bitterness in the green applies to the ripe fruit, except that far greater care must be taken in picking and handling, and a much larger quantity of salt must be used in pickling, and extreme care in keeping them from the air and sunlight; for when exposed to the air they will rust quicker than pork under the same exposure, and are more offensive when spoiled.

The high price of meat will ultimately make an unlimited market for ripe pickled olives. The price of one pound of meat will buy two pounds of olives when the market is fully supplied, and this, too, at a profit to the grower so far above the profit derived from the production of wheat or any other cereal grain that the wonder will be why attention has not been drawn to the subject before.

The price of pure olive-oil will permit the manufacturer to pay from six to eight cents per pound for ripe olives. A fair estimate, taking one year with another, for trees ten years old, is about 200 pounds, or $12 to $16 per tree, which, with eighty trees (most people plant one hundred trees) per acre, gives say $1,000 per acre, from which the expense of picking must be deducted, equal to about $1.50 per tree. Trees at four years old should average at least three gallons each, or about $100 per acre; at three years old they should produce enough to pay expenses of cultivation.

Make the olives into pickles, and examine the result. No one claims that eight gallons is above the average product of a six years old tree, which will

fill four dozen bottles of the ordinary size, for which the wholesale price, per case of four dozen bottles, is $18 to $26 per case, or per tree, which, with eighty trees per acre, is equal to $1,440 to $1,680. Now, this is what the dealer pays; the consumer from 50 to 75 per cent. more.

The cares attendant upon the cultivation of a ten-acre olive orchard are not greater than on any ten acres in any other section of the United States. Any good man can, without assistance except in fruit-picking, cultivate twenty to thirty acres in olives, nor need he hurry, or worry, or work hard. Indeed, he can take far greater comfort and have more leisure time than can be had in any other section on any area allotted to the care of one man.

Of all the good things which nature has provided for man, the olive, in all countries where it can be successfully cultivated, stands pre-eminent. In our exceptionally dry climate lies our wealth. Here the olive flourishes, not, as would be reasonably supposed, in our rich bottom lands, but on the high "mesa" or table lands, where surface wells are thirty to sixty, or even one hundred, feet deep, and especially on rolling land where natural drainage is secured. The diversity of soil, climate and topography gives to our natural resources a wide range, and embraces, by judicious selection of location, the successful cultivation of all the crops grown in any other State of the Union, excepting sugar and rice. The remote liability to frost on our table lands, our light or heavy soils, exposed or sheltered localities, the exceedingly favorable conditions of climate, which offer scarcely an interruption to experimental or practical operations, altogether conspire to attract the attention of the enterprising immigrant from any quarter of the globe. The highest dream of the horticulturist may almost be reached in that portion of Southern California contiguous to the bay of San Diego.

THE EXCURSION TO EUCLID.

BY THE SECRETARY.

Euclid Township is situated in the eastern portion of Cuyahoga County, Ohio. A village of the same name, ten miles east of Cleveland, on the line of the Nickel Plate Railroad, serves as a post-office and shipping point for the vineyardists of this favored region.

In addition to the facilities furnished by the railroad for shipping the vintage of Euclid, they have a direct and leading thoroughfare, which is but the extension of the celebrated Euclid Avenue, one of the most beautiful streets on the continent of America, extending out from the city of Cleveland, and affording a highway unsurpassed for carrying to market the products of vast vineyards and gardens along the line.

The vineyardists of Euclid are, almost as an invariable rule, the intelligent descendants of the old Connecticut Company, that originally settled the noted Western Reserve, of Northern Ohio. I mention this fact to show that it is not necessary that a man should be a foreigner in order to insure his success as a vineyardist.

It was on Friday, September 10th, last, that the American Horticultural Society, then in session in the city of Cleveland, accepting the invitation of the Eastern Cuyahoga Horticultural Society, visited Euclid. A street-car ride of some two or three miles, following the line of Euclid Avenue, brought us to Lake View Cemetery. An hour was spent in a stroll through these handsome, artistic grounds, where, among other striking objects of art, is the well-nigh finished monument to the memory of the lamented Garfield, and where also rest his mortal remains. Near the entrance to the cemetery the outgoing train on the Nickel Plate Railroad took us up and bore us onward to Euclid, stopping, however, some distance short of the village, where we were met by the people of the vicinity with carriages, and

THE DRIVE THROUGH THE VINEYARDS COMMENCED.

Geologically speaking, an old lake shore extends eastward from Cleveland, at a distance of several miles from the present shores of the lake. This old lake shore is an abrupt bluff, of near one hundred feet in height. Euclid Avenue follows the foot of this bluff, while the Nickel Plate Railroad cuts across the lower plateau, at a distance ranging from half to three fourths of a mile, towards the lake. This lower plateau, which was the old bed of the lake, is slightly inclined towards the lake. Below the line of the Nickel Plate Railroad grapes are very little grown, as the land seems to become too level, inclining to wet. From the foot of the bluff to the railroad there is one continuous vineyard for miles. The upper plateau is also cultivated in the same way, for a half mile or more back from the top of the bluff. There are, therefore, two very distinct geological formations occupied by these extensive vineyards, the one having been for ages above high tide, while the other was more recently the bed of a lake, though it is fair to assume that the washings from the bluff, or upper plateau, have fully and completely covered up the original sedimentary deposit of the lake, until the soil of the lower plateau, for at least as far out as grape-growing is successful, has assumed very much the character of that above. So, in reality, there is little difference seen in the results of grape-growing, whether on the upper or lower plateaus, further than would be due to the difference in fertility, culture and altitude.

From where we left the railroad, we were first driven to the upper plateau, at a point where the line of the bluff projected far into the old lake, and where the lower plateau for miles was presented to view. This vast view was an almost continuous sea of vines. The vineyard, on the bluff, in which we stopped to take this first view, was the oldest in the vicinity, but we were shown many of the original vines, now over a quarter of a century old, that were in perfect health and loaded with luscious grapes. From here we were driven first on the bluff and then along the lower plateau for miles, being almost continuously surrounded by vineyards, stopping frequently to test the luscious fruit, or to inspect, more critically, modes of culture, methods of gathering and pack-

ing for market (for it was in the midst of the grape harvest), manner of pruning and training, etc., until we were finally brought together on the beautiful lawn of one of the most prominent members, where the local society had prepared a banquet in honor of our visit, and to which we were made welcome in a most cordial manner. After the banquet and after the usual formalities of such an occason, we were borne, by a returning train, to the city.

THE LESSON.

The social pleasures af the day spent in visiting the vineyards of Euclid well repaid all who were so fortunate as to be present, though the practical lesson taught us was of far greater value. Very few of the grapes grown in this region are made into wine; indeed, we only visited one vineyard where any attempt at wine-making was practiced. As I interpreted the signs of the times, this result is probably as much due to the temperance sentiment of the people engaged in grape-growing, if not more so, than to any considerations of pecuniary profit. The leading varieties grown are the Concord, the Catawba and the Delaware, all of which succeed admirably. Other varieties, however, do well, and there are few vineyards in which we did not find more or less of other sorts, such as Niagara, Worden, Pocklington, Moore's Early, etc.

The system of culture, pruning, training, etc., is quite uniform in all the vineyards visited. The planting is in rows of six or seven feet in width and near the same distance from plant to plant. For the first year the young vines are allowed to run at will without stakes. During the winter following, posts are set at intervals of about one rod, and to these one wire is attached at the height of eighteen or twenty inches from the ground. The young vines, after being pruned, are tied to this wire, to which arms are trained during the second year's growth. The winter and spring following, two additional wires are attached to the posts, to which the growth of the second year, after being properly pruned, is made fast by tying. From this time on the vines receive a regular annual pruning, during the fall and early winter, when all surplus wood is removed, and a regular tying and straightening up in early spring. The summer pruning consists mainly in an occasional clipping of

U of M

straggling shoots. By this method of training each vine is made to assume a fan-shaped form on the trellis, thus affording all portions of the vine ample exposure to light and air.

THE BANQUET AND AFTER-DINNER SPEECHES.

As a fitting introductory to the pleasant entertainment of the day, the following, from the columns of the *Rural Home*, whose able editor, P. C. Reynolds, was one of the party, is here republished:

"Returning a short distance, we entered the grounds of our escort, Mr. Cushman, and there the ladies of the Eastern Cuyahoga County Horticultural Society were spreading tables on the green lawn, under the 'brave old overhanging oaks,' and loading upon them the luxurious products of fields, orchards and vineyards, manipulated by fair and dexterous hands into tempting viands to regale our appetites, already surfeited on the fruit of the vine.

"Before sitting down to the ample repast furnished, we walked with the junior Mr. Cushman through his vineyard of about twelve acres. As we had suspected, from such an energetic, progressive young man, we found the vineyard in excellent condition, soil clean and mellow, vines vigorous and well trained, and weeds conspicuous by their absence. The ordinary market varieties of that locality, Concord, Worden, Delaware and Catawba, were well loaded with fruit, and many of the newer sorts were on trial. There is a small spot in the vineyard of stiff clay, a cold soil, too poor for the Delaware, on which they test new varieties, convinced that if they flourish there it will be safe to plant them. Here Ulster Prolific and Poughkeepsie Red had been planted, and while the former had made a good growth and borne some good fruit, the latter had done no better than Delaware, on the same soil. Empire State had also made a good growth of vine, but had not yet borne. Among other new varieties, they fruited Jessica this year. It had mildewed some, but is a good early grape for the amateur.

"When about to dine, the Euclid Cornet Band, of some eighteen pieces, marched upon the ground, and during the remainder of the exercises, entertained us with music that would have been a credit to any of our best city bands."

(The Secretary is indebted to S. D. Hillman, of Minnesota, for the following short-hand report:)

After the *feast* came the *gush* of sentiment. The Rev. Mr. Webster, of Euclid, on behalf of the Eastern Cuyahoga Horticultural Society, said:

"I yield to the request of my neighbors and friends, fellow members of our local Society, to bid you welcome to our midst. We are young as a

Society. It is only about nine months since we were organized on the very spot on which we are now assembled. Our monthly meetings have been interesting and profitable. At our July meeting our worthy President suggested that there was soon to come to our neighborhood, into the beautiful city of which we are soon to become a part, a Society of national name and importance, and that we invite them to spend a day during the meeting as our guests. Since that time we have looked forward with pleasing anticipations to the day now closing. The associations of to-day have been, to us, pleasant and profitable, and can not fail to add strength to our little vine as we seek to train it upward. I have spoken of the nationality; we welcome you for the name America! What loyal heart thrills at the word! What scenes present themselves to view over the field it covers! Scenes stranger than fiction greet us in these days—and how the heart rejoices if they are connected with such scenes as these—that have been connected with other scenes that have thrilled us when the war cry was heard. That war is now over and the "boys in blue," many of them, are connected with the more peaceful organizations of horticulture. Stranger than fiction was that great triumph of peace that enabled the President of the Nation, by the touch of his finger, to start in motion the machinery of the great Philadelphia Exposition, and more recently the fair fingers of the new bride, from her temporary home in the Blue Mountains, to start the ponderous wheels of Machinery Hall at the Minneapolis Exposition. And still more recently, when the fingers that fashioned the stars touched the mountains and they shook at His majestic tread along our valleys, leaving desolation and destruction, which called forth a thrill of sympathy throughout our land.

"But not only American, but 'Horticultural' cheers us. You need not be taught by me what scientific men are telling of the influence of the forest trees over this land of ours. We were early taught to destroy the noble forests. My father, in my earliest recollection, on this Western Reserve, used to say, 'there are three arguments for keeping a good fire: to get rid of the trees—that we may keep warm, and that we may have more ashes to sell.' When the first church, of which I now have the honor to officiate, was being erected, many of the subscriptions were marked 'to be paid in ashes.' Ashes were better than grain, and were a 'legal tender' in the payment of the pastor's salary, and the salary was governed by the *bushels*, and not by the price.

"Then we welcome you for your name and for your work; but I need not dwell longer upon the character of the work, as I presume you have had enough to satisfy you this past week; and therefore I will close by renewing the very hearty welcome which the Eastern Cuyahoga Horticultural Society extends to the members of the American Horticultural Society."

President Earle—The committee appointed to prepare a few sentiments to be read on this occasion have handed me the list I hold in my hand:

"Horticulture—It is a good thing. It is good for the young people, for it keeps them busy; it is good for the old folks, for they grow old handsomely."

The truth of this sentiment I see demonstrated all around me, and, as a proper illustration of how it works, I will call upon the Hon. J. M. Smith, of Wisconsin.

MR. PRESIDENT: I fear you have made a selection that is "somewhat mixed." I don't know but what you think you are going to get a speech, and a very eloquent one, but you will not, simply because I don't know how to make it. I feared, until within the last two or three minutes, that there was a conspiracy in this Society to kill us all off! My friend over here says it is not so, and we will take his word for it. Previous to that I feared they were going to feed us all to death. But as long as my friend Van Deman lives I am very sure the rest of us are going to stand it. [Laughter.] That sentiment is all right. Horticulture is a good thing for the boys and girls, for it keeps them busy, and it makes pleasant work for them. I know of nothing more pleasant and more agreeable. I don't believe there is any occupation more pleasant, more healthful, more noble and grand in its results, than is to be found in the practice of horticultural pursuits. If, with my present knowledge of the world—and it has been somewhat extensive—I was young again, and had to choose the occupation of my life—what I should follow—I know of nothing, no pursuit, that I could enter into with more earnest, zealous enthusiasm than the study and practice of horticulture and its attendant pursuits. I was brought up on a farm, and love all the associations of farm life; but of the two occupations, horticulture is the more elevating, as well as affording a wider field for education and scientific research.

Our President tells us that horticulture is a good thing because we grow old "good-looking." Probably he aims to prove this by my person. [Laughter.] Whether you recognize the fact or not, I will refer you to his good looks—though it does not seem to me that he is ever going to grow old. The trouble with me is, I did not go into the business early enough. But, my friends, I am detaining you, and only wish a word of apology to our Euclid friends. Had I known how well you knew your business, as I now know it, I should not have dared to speak, in our meeting and in your presence, of my knowledge of horticulture in general and of grape-growing in particular. I now realize that I am only a student in grape-growing.

Prof. Lazenby, of Ohio, responded to the toast:

"Horticulture as a Profession—As a profession as well as an art, and as a business."

The professor said:

Horticulture is a fine art. This is especially true of the branch known as floriculture. As a business, some object to horticulture on the ground that it does not pay. I believe it does pay. We speak of failures, and think of untimely frosts, and rots, and nests, and mildew, and bugs, and then realize that there are great risks to run in horticulture. But there are risks to run in other professions, and it takes years to climb to the top in any business. When Herbert Spencer was in this country he was asked what feature of American life he would criticise, and in reply said that in America life was for work and study, when work and study should be for life. So it is that our work and study should give us the pleasure that makes life worth living. Horticulturists deal with nature. We can not grow figs on thistles, and we must reap as we sow. Horticulture provides us a luxury by giving us health. Let us look at horticulture as a science. I will illustrate my ideas by a wheel. The hub is the common school education, from which the spokes spring out; the spokes are the sciences, and the rim that receives all the spokes is horticulture. It has something taken from every science, and depends upon them all.

Mr. L. B. Pierce, of Ohio, was called upon to respond to the toast:

"Our American Homes—We love the horticulture that makes them beautiful outside, and our wives, mothers and daughters who fill them with joy inside."

In reply he said:

I think the sentiment expresses completely all that is worth saying. If the home is beautified both outside and inside, there is nothing left to desire. What can be more beautiful than to see a home surrounded by green lawns, shady trees and bright flowers? You will find that horticulturists often show their admiration for the gentler sex by naming fruits and flowers after the ladies. In this I do not include Mr. Van Deman, of the District of Columbia, who advised that we change the name of a worthless strawberry from "Big Bob" to "Little Sal."

C. A. Green, of New York, made the following response to the toast:

"The Press—It is like a great tree, whose roots extend into all the relations of life, and whose branches spread wider and wider where there is a free, happy and prosperous people. The Farm and Garden, as it is said, have to be kept clean of weeds."

In reporting the proceedings of these meetings, I have had an opportunity to notice some things. I don't know where I have read or heard more accu-

rate and able reports than were made here. The press have stood by us, and those who have made these reports have denied themselves of sleep and have done their work not without a good deal of effort, and they are entitled to a great many thanks. There are some weeds in the horticultural press. I remember reading an advertisement of a remedy for potato bugs. It was to be sent for so many stamps; and the remedy consisted in taking a block of wood and laying him on it, then take another block and lay it on the bug and squash it. That is all there was of it. Lately we have had two national fruit-growers' associations. There was one humbug, advertising for a few cents to tell how to make an evaporator to do wonderful things; and the whole scope of the thing was to tell for fifty cents how to get an evaporator worth seven dollars. There are weeds, and there are a great many of them that the agricultural and horticultural press can find out.

Another weed is the horticultural editor who don't know anything at all of horticulture; who is in the horticultural chair and lives on breeding weeds; one who never saw a strawberry plant, and don't know a hop-vine from a bean-pole. There are lots of them whose papers and editorials are made up of some clap-trap which has been dead and buried for fifty years. These are the people that lead the masses astray. Where there is one man that attends a meeting of this kind, there are ten thousand at home. This part are to be educated by the press, and how shall they be educated if we have editors that know nothing about it?

"Horticultural Societies—They can no more be run without a good Secretary than a kite can fly without a long tail."

Called forth the following from Secretary Ragan:

I believe I will have to grant the correctness of the sentiment. But I am unable to conceive why I should go further. There are many reasons why I shall not attempt to make a speech. First, I can not. A Secretary is not supposed to be a speech maker; that is not his *forte*. He will find other duties to perform, if he fulfills the sentiment as read before you; that is, if he is a good Secretary. This is one reason why I can not make a speech. Another is that "life is short." But, Mr. President, I can not refrain from expressing my hearty thanks to a certain class of gentlemen who have been increasing in our ranks from the earliest history of this organization. I refer to the representatives of the press. Without these I am unable to see how your present Secretary, or any other Secretary that you may have in the future, will be able to perform the arduous duties that you will require of him. He must rely very largely upon the press. And the best and most positive evidence that I recognize of our permanent prosperity is the fact that we are annually drawing to our meetings more and more of this class of useful attendants. From the valuable reports that have gone out already from the local press and that will be reiterated over the land for weeks and

months to come by the rural press, I must rely largely for a correct and entirely representative report of this meeting just closing.

Now, Mr. President, I think I will say nothing further than to thank you again for the able services that you have always performed in your official relationship to the Society; and the hope that you may "never grow old," or too old, at least to meet with us, to encourage and help us along. [Applause.]

The next sentiment:

"Horticulture in the South—It is aspiring like her mountains; it is widespread like her plains; and its harvests are golden and sweet like her peaches and her oranges."

Called forth a response by George E. Boggs, of North Carolina:

I have been contrasting in my mind to day the difference between the kind of *grape and canister* with which I have been greeted and the kind of bullets with which I was pelted not quite a quarter of a century ago by some from this section [laughter and applause], and I assure you I greatly prefer those we have had to-day. [Renewed laughter.]

I am very sorry that our President had not chosen some one better able to respond to the sentiment. I am only a novice in this field. It is true that during my boyhood and early years, as an amateur, I gave a good deal of attention to fruit culture in a small way But many years of active life followed which quite drifted me away from such occupations. Within the last two years I have resumed such work, and returned to my "first love," and find myself quite overwhelmed with the great strides that this business has made throughout our whole country. It is very true that your own section, as yet, is far in advance of ours in this noble work. We have had great disadvantages to contend with. Twenty-five years ago horticulture was in its infancy, as you might say, throughout the country, and for many years subsequent to that period the South was in such a condition as to make but slow progress in any material direction; the struggle for a time was for the necessities of life. But there has been a revolution in labor, and there has been a wonderful progress in this direction. The people are becoming thoroughly impressed with the great importance of diversified labor, and great numbers are turning their attention to horticulture as a business. My experience has been somewhat limited, and I have been quite isolated, as I have gone into the mountains of North Carolina, a section of the State which is beautiful in its physical characteristics and of wonderful resources, but as yet only beginning to be developed, and I am working in that field comparatively alone. But it is easy to see that great progress is being made there, and that erelong that sunny land will be largely devoted to horticulture. We have a region of country possessed of wonderful resources and well adapted to this business. I cordially invite any who feel disposed to

seek a land that I deem even more beautiful than your own beautiful land to come and see the many advantages that our own immediate section offers.

I have greatly enjoyed meeting with you, and being thrown elbow to elbow with those of you that have been engaged in this cause for so many years. I shall go to my home determined to pursue my work with renewed courage, hoping that some time my own section shall be somewhat comparable with this beautiful region hereabout.

President Earle—American horticulture has a great name—a name that covers the whole of this continent. The Society is intended to embrace not only this great empire of the United States, but the great empire north of us, and of all peoples that speak the English tongue on this continent. I am sorry that this fact has not been more clearly understood, and that more of the people of the Dominion had not come to visit us and to mingle with us at this meeting, but nevertheless I give you this sentiment:

"The Great Dominion to the north of us—Its rigorous climate makes a vigorous horticulture. We invite the fullest co-operation of our northern neighbors in our American Society, which is as much theirs as ours."

Mr. Little, of Ontario—

MR. PRESIDENT, LADIES AND GENTLEMEN: I am only sorry that a more competent individual was not with you to-day, to give you more of the history of horticulture in Canada, than I am. Certainly we are progressing, and progressing nobly, and I am very much pleased to hear, and to take back to Canada, what I have heard told me before of your kindness, and your sympathy, and your hospitality, and your wholesouledness, to those who have come to visit you on former occasions. I was told that:

Horticulture is refining in its influence, and it provides work, as my honored friend says, for the young people, not only male and female in their single capacity, but when they have become what I may term "mutual friends"—man and wife.

We used to think that in this free land of yours there was freedom for the development of your energies not only in this respect, but in every respect that is calculated to ennoble and uplift, and to bring joy and gladness to every fraternal home. It would be, I think, sir, no part of duty in me to prolong my talk, especially when there are others better able to talk about horticulture than I; for it appears to me that I was one born out of due time. [Laughter.] But during that time I have met with many of name whom I have been so happy to meet—yes, sir, among the rest my friend Smith, the first speaker; and they were talking about you, sir, never "getting old." And there is just one way, sir, you will never grow old and never die:

Let both you and I, and every one of this assembly, be as faithful in the service of the Great Master as you and I seem to be in our devotion to this delightful employment. In going along these hills to-day, and looking at the power or the gift He has given to man to take from the primeval forest that which shall yield the bountiful fruit of your vineyards, it seemed to me the most beautiful sight I had ever seen. Probably I will never see such another sight again until I get to the hills of Zion and taste the "golden fruit"—fruit that will endure from everlasting to everlasting and world without end.

I am like my good friend Smith: I am sorry I did not begin horticulture early. I had been much among men before ever I commenced to grow the strawberry, and before I had a passion for its cultivation. But now I can go out of my house into my garden and plant it myself with my own two hands; and when they come to grow I just watch them with something like the interest I used to feel in looking at my children when they were but little rosebuds toddling about. And here they come up, with their tiny leaf, as they grow and expand after the winter's frosts have gone, and enliven all the slumbering strength within. It seems to me, sir, that the hand of the Great Maker is seen in them as in nothing else; and I think, when the blossom appears, and shortly the fruit is seen and begins to mature, that when the bright berry hides herself away among the leaves of the plant she is just like a blooming, blushing maiden, saying coyly, under her blushes, "Just kiss me if you dare!" [Laughter and applause.] They are, sir, just an emblem of the purity and the grandeur and the nobler influences of horticulture. And, sir, there is something ennobling in their cultivation that you and I can scarcely comprehend, with all our boasted wisdom in the small fruit line. And then its growth is so gentle that it seems to me its cultivation is ennobling in its nature, in its rapid development under the refining influences of the sun and moon and stars, and the rains that water the earth, and they spring up so bountifully—more than a thousand fold, exceeding anything else with which I am acquainted in the world.

I advise my young folks to give heed to a word of exhortation. You will never hear John Little's voice on the shores of time again. And now I entreat you, when I think of the influences that gather you here to-day, the horticultural influences, and above all the rich human kindness, to so enrich your faith and make your peace of mind with that which we can not live without aright; for "man can not live by bread alone, but by every word that proceedeth out of the mouth of God."

You will pardon me, sir, when I put horticulture and religion together; it has such an ennobling influence upon the nature. I am told that is something like what is said between a young man and a maiden in privacy; it is something kindly and good-opinioned, even if it be nonsense. [Laughter.] What a wonderful tendency it has to bring young and old together! Why, I am just as happy to-day as if I was in Canada. We seem so well acquainted; your cheerful faces, your kindly greeting, and your sympathy

are so touching. Yes, it will be a red-letter day to me when I think of your kindness; it will be a source of pleasure, friends, to think that here to-day we met on this beautiful lawn, surrounded by these many horticultural friends; and it ought to create these feelings in these young people more especially, for they will soon take our place. Let them begin right; let them start right, not only in their household affairs, but in their religious relations. The happiness of the home, it seems to me, sir, does not consist in riches, in gold, or honor, or in all the emoluments of time; but consists in the man and the woman living in the fear and in the love of God, and training up their children, not only for the business duties of this life, but that which is of far more importance, that when sun and moon shall cease to shine, they shall stand in the ranks of the redeemed and enjoy the happiness that shall never fade away in my Savior's home over yonder.

And with this I bid you good-bye, hoping that you will long be the heroes of this Society, and that other young men will join in the good cause, and that yet others may add to their knowledge concerning the growth of fruit, not only from the forests, but the fruit of the fields, and that this spirit of horticulture may continue in its progress and in its refining influence until there shall not be one drop of alcohol distilled in any part of the United States or in Canada so long as the world shall stand. [Loud applause.]

President Earle—We are fortunate in having at least one person from Canada, and I promised you that he was a good representative, and you see that he is. We are fortunate in having one present from a far more distant empire, and that is our good friend from the Empire of Japan, whom you have all got acquainted with, and whose abilities and qualities you esteem. I want to give you this sentiment:

"The ancient Empire of Japan—She has sent us her fruits and her flowers; now she is sending us her horticulturists, who are welcome."

Mr. Tamari, of Japan, then came forward, amid applause, and responded briefly. He said:

It is not my province to speak my sentiments, because I came to this country to study your system of agriculture and horticulture, and I am treasuring up the same and will "expose" what I have seen and heard in this country upon my return home. We are a nation of vegetarians in Japan, very few cattle or sheep being found in the empire. It is not a matter of pride, but rather of necessity or economy, animals requiring more space for pasturage than can be spared. Many centuries have passed away since animal food was mainly dispensed with; but now, that the country has been opened, much other food will be consumed. I hope to be able to be

at the next meeting of the Society, at San Francisco, where I would be pleased to make an exhibit of some of the fruits and vegetables of Japan.

President Earle then read the remaining sentiments, which, for lack of time, were not responded to. They were as follows:

"The Vineyards of Euclid—They look as healthy and handsome as their owners. May they feed their owners as sumptuously as their owners have fed us." [Applause.]

Set for E. H. Cushman.

"The Department of Agriculture—We give all honor to its noble chief, and recognize his vigorous efforts to advance the cause of horticulture."

Mr. Van Deman would have responded to this sentiment in behalf of Commissioner Colman, had there been time.

And lastly, I give you this:

"Among the sweetest blossoms of horticulture is hospitality. The neighborhood of Euclid appears now to be in full bloom." [Applause.]

Set down for Hollister and Cook.

"Our Agricultural Colleges—They are an immense power for good. We will sustain them and they will enlighten us."

For Prof. A. B. McKay, of Mississippi.

Mr. Green, of New York, then offered the following resolutions, which were unanimously adopted; after which the Society adjourned *sine die:*

Resolved, That we extend to the local committee and citizens of Cleveland, to the State Horticultural Society, and to the Eastern Cuyahoga Horticultural Society an acknowledgment of our appreciation of their efforts, and of the successful management of the fruit exhibition, and for the liberal premiums awarded.

Resolved, That we thank the local press for the enterprise it has shown in publishing so fully the reports of our convention, and to the horticultural press of the country, who were represented, for the interest taken in our meeting.

Resolved, That we also offer our thanks to the Board of Trade for the use of their room, to the Forest City House for reduced rates, to Messrs. A. C. Kendel and E. H. Cushman and the good people of Euclid for their hospitable entertainment.

T. S. HUBBARD,
CHAS. A. GREEN,
Committee.

APPENDIX.

THE UNIFICATION OF HORTICULTURAL SOCIETIES.

BY THE SECRETARY.

On page one hundred of this volume may be found a paper by Mr. James G. Kingsbury, of Indiana, in which is argued, at some length, the general advantages of concert of action on the part of the various National Societies for the promotion of horticulture, which paper is followed by a discussion of the subject, participated in by several members of the Society. Since the meeting at Cleveland, the Secretary has presented this subject, by letter and otherwise to officers of the leading Associations and Societies of the land, which, in several instances, has elicited the most cordial responses, and in no case an unfavorable reply. The original idea of such an organization as is herein contemplated came from Mr. T. V. Munson, of Texas, in a letter to the Secretary, received early in the year 1886, and in which numerous suggestions were made concerning the programme of the Cleveland meeting.

In a conversation with Mr. C. W. Garfield, of Michigan, Secretary of the American Pomological Society, in December last, he most cordially endorsed the proposition of a union of effort.

Mr. W. C. Strong, of Massachusetts, replies, under date of November 8, 1886: "It is not surprising that Col. Wilder should be somewhat jealous of your Society, and it is difficult to see how the two Societies will not somewhat overlap each other. Col. W. can not continue much longer. While he lives we want to be careful of his wishes. But when he is gone, I trust the two Societies may be united in one strong and active Society, which shall embrace the continent."

Hon. C. L. Watrous, of Iowa, President of the American Association of Nurserymen, Florists and Seedsmen, replies, on December 24, last: "As to the plan mentioned for a union of all branches of effort having to do with trees, plants, seeds and fruits, I think it a very wise one, and one that would save expenses and add to the nature of the work done. You can count me as one that would be very glad to see the action consummated, though I fear that individual ambitions or jealousies may hinder its accomplishment. I shall be interested in knowing how other men view the proposition."

On February 10, 1887, I received the following response from Mr. B. E. Fernow, of Washington, Secretary of the American Forestry Congress:

"For several years I have thought and felt like you in regard to the advantage of combining similar National Associations under one hat, and

thus not only concentrating the work, but also enabling them to do better and more telling work by united effort and united treasuries. This idea was shortly ago broached to me by Mr. Garfield, of the Pomological Society, and I at once pledged, as far as I could, the American Forestry Congress to such a plan. The best manner of accomplishing it, seems to me, even this year to bring as many Societies of that nature to meet at the same place at the same time, and see how it works, preparing, if found agreeable, to bring about a consolidation the following year. We have not yet decided upon a place of meeting, but our time is fixed for August or September. I am not well enough known to make this proposition, but we will wheel into line if the line is forming, I am sure. Please consider and act upon this as you think best."

To this I replied, suggesting that the Forestry Congress meet with the American Horticultural Society, in California, in February, 1888, which called forth the following response from Mr. Fernow, under date of March 14:

"Your letter of February 12 came during my absence in Florida, and has therefore been delayed. Unfortunately, our Congress is constitutionally bound to meet in August or September, and must therefore, this year, stick to it. That I am, however, trying my best to follow up the suggestion of a union, you will see from the enclosed circular letter. I had expected some such action on the part of Mr. Garfield, with whom, I believe, the idea originated, which had been, however, latent in my mind a long while. Let us try to work up the desirable details of such union and see to it that it is properly presented at the different meetings of the Horticultural, Pomological, Agricultural, Farmers' and Forestry Congress in such manner that the next meeting of these be so decided upon as to allow a general reunion. I believe no answer to the circular on your part is necessary, as your meeting is fixed, and I suppose that, further, you rule your Society as independently as I do mine, having my propositions generally acceded to. If you have any suggestions to make, how to work this matter, I shall be glad to aid.

"Truly yours, B. E. FERNOW, *Sec'y A. F. C.*"

The circular referred to in Mr. Fernow's letter, I here reproduce, and, as I have already written him, fully endorse, so far as Societies of a strictly horticultural character are concerned; but doubting the propriety of calling into this union organizations of an agricultural character, in view of the danger of overloading, and from the fact of the uncongenial character, especially of that branch of agriculture which embraces live stock, etc. Following is the circular referred to:

"DEAR SIR: It has been proposed to bring about a unification of all the National Societies, which are formed for the advancement of allied interests, into an association somewhat similar to the American Association for the Advancement of Science; representing, as it were, the practical application of science in the art of agriculture, horticulture, arboriculture, pomology, forestry, etc. The purpose of such a union would be, 1st, to concentrate the energy of a larger number into the same channels of work; 2d, to simplify and cheapen the arrangements for annual meetings and increase their value; 3d, to reduce the expense of publications, as well as to insure larger circulation, and many other advantages which will suggest themselves to everybody. While each society may preserve its own identity and constitution,

as far as this does not interfere with the objects of the union, a council representing each of them, with the necessary board of officers, would manage the mechanical part of the meetings, publications, etc. In order to facilitate such a union at the earliest possible date, it appears desirable that as many of the societies as have not yet determined upon their place of meeting for the coming season, meet in the same place and at the same time, for further discussion of the problem. The undersigned has taken it upon himself to set the ball in motion, and would respectfully ask the council of each society to state, 1st, whether such a plan as proposed is in general apt to find favor with their society; 2d, where and at what date their annual meeting will be held; 3d, if not determined upon, where, in their opinion, and at what time their meeting may be most conveniently held; 4th, any other suggestions by which the realization of this plan may be forwarded in their society. I would also say that the time and place of meeting of this Congress is not yet determined upon, and that I feel sure its officers will gladly determine upon such place during August or September (constitutional proviso), and will attract any one or more other societies. Chicago, Columbus, or any other central place preferable. Please consider this matter urgent, and let me have your reply as early as possible.

"Very respectfully, B. E. FERNOW, *Sec'y.*"

ROSTER OF OFFICERS

Of National, State and Important Local Horticultural and Kindred Societies, for the Years 1886–7.

AMERICAN HORTICULTURAL SOCIETY.

Hon. PARKER EARLE, President, Cobden, Illinois.
T. V. MUNSON, First Vice-President, Denison, Texas.
W. H. RAGAN, Secretary, Greencastle, Indiana.
Major J. C. EVANS, Treasurer, Harlem, Missouri.

AMERICAN POMOLOGICAL SOCIETY.

*Hon. MARSHALL P. WILDER, President, Boston, Massachusetts.
P. BARRY, First Vice-President, Rochester, New York.
C. W. GARFIELD, Secretary, Grand Rapids, Michigan.
BENJ. G. SMITH, Treasurer, Cambridge, Massachusetts.

AMERICAN FORESTRY CONGRESS.

Hon. G. W. MINIER, President, Minier, Illinois.
Hon. H. G. JOLY, First Vice-President, Quebec, P. Q.
E. T. ENSIGN, Recording Secretary, Colorado Springs, Colorado.
B. E. FERNOW, Corresponding Secretary, Washington, District of Columbia.
LEO WELTZ, Treasurer, Wilmington, Ohio.

AMERICAN ASSOCIATION OF NURSERYMEN, SEEDSMEN AND FLORISTS.

Hon. C. L. WATROUS, President, Des Moines, Iowa.
M. A. HUNT, Vice-President, Wright's Grove, Illinois.
D. WILMOT SCOTT, Secretary, Galena, Illinois.
A. R. WHITNEY, Treasurer, Franklin Grove, Illinois.
U. B. PEARSALL, Fort Scott, Kansas,
S. D. WILLARD, Geneva, New York,
LEO WELTZ, Wilmington, Ohio,
} Executive Committee.

* Deceased.

SOCIETY OF AMERICAN FLORISTS.

ROBERT CRAIG, President, Philadelphia, Pennsylvania.
J. C. VAUGHAN, Vice-President, Chicago, Illinois.
EDWIN LONSDALE, Secretary, Philadelphia, Pennsylvania.
MYRON A. HUNT, Treasurer, Wright's Grove, Illinois.

ARKANSAS STATE HORTICULTURAL SOCIETY.

W. J. PATTON, President, Little Rock.
W. S. THOMAS, Vice-President, Little Rock.
W. K. TIPTON, Recording Secretary, Little Rock.
S. H. NOWLIN, Corresponding Secretary, Little Rock.
J. W. GALLAWAY, Treasurer, Little Rock.

COLORADO STATE HORTICULTURAL SOCIETY.

E. J. HUBBARD, President, El Moro.
J. M. CLARK, Secretary, Denver.
WILLIAM DAVIS, Treasurer, Denver.

CALIFORNIA STATE HORTICULTURAL SOCIETY.

Prof. E. W. HILGARD, President, Berkeley.
A. T. HATCH, Vice-President, Suisun.
E. J. WICKSON, Secretary, Berkeley.
R. J. TRUMBUL, Treasurer, San Francisco.

CALIFORNIA STATE BOARD OF HORTICULTURE.

ELWOOD COOPER, President, Santa Barbara.
S. F. CHAPIN, Vice-President, San Jose.
A. H. WEBB, Secretary, San Francisco.

CALIFORNIA FRUIT UNION.

A. T. HATCH, President, Suisun.
L. W. BUCK, Vice-President, Vacaville.
H. A. FAIRBANK, Secretary, San Francisco.

FLORIDA FRUIT-GROWERS' ASSOCIATION.

D. REDMOND, President, Jacksonville.
W. H. SEBRING, Vice-President, Bronson.
D. GREENLEAF, Treasurer, Jacksonville.
D. H. ELLIOTT, Secretary, Jacksonville.

GEORGIA STATE HORTICULTURAL SOCIETY.

P. J. BERCKMANS, President, Augusta.
FRANK S. JONES, First Vice-President, Herndon.
T. L. KINSEY, Secretary and Treasurer, Savannah.

INDIANA HORTICULTURAL SOCIETY.

SYLVESTER JOHNSON, President, Irvington.
J. C. STEVENS, First Vice-President, Centreville.
C. M. HOBBS, Secretary, Bridgeport.
DANIEL COX, Treasurer, Cartersburg.

ILLINOIS STATE HORTICULTURAL SOCIETY.

E. A. RIEHL, President, Alton.
MILO BARNARD, Vice-President, Manteno.
A. C. HAMMOND, Secretary, Warsaw.
H. K. VICKROY, Treasurer, Normal.

IOWA STATE HORTICULTURAL SOCIETY.

C. G. PATTEN, President, Charles City.
EUGENE SECOR, Vice-President, Forest City.
GEO. VAN HOUTON, Secretary, Lenox.
HENRY STROHM, Treasurer, Iowa City.

KANSAS STATE HORTICULTURAL SOCIETY.

GEO. Y. JOHNSON, President, Lawrence.
MARTIN ALLEN, Vice-President, Hays City.
G. C. BRACKETT, Secretary, Lawrence.
FRED. WELLHOUSE, Treasurer, Fairmount.
E. P. DIEHL, Olathe,
Dr. CHARLES WILLIAMS, Washington, } Trustees.
L. A. SIMMONS, Wellington,

KENTUCKY HORTICULTURAL SOCIETY.

W. COOK, President, Bowling Green.
D. L. STALLARD, Vice-President, Woodburn.
JAS. T. BARBEE, Secretary, Glasgow.
A. D. WEBB, Treasurer, Bowling Green.

MASSACHUSETTS HORTICULTURAL SOCIETY.

HENRY P. WALCOTT, President, Boston.
ROBERT MANNING, Secretrry and Librarian, Boston.
G. W. FOWLE, Treasurer, Boston.

MAINE STATE POMOLOGICAL SOCIETY.

CHAS. S. POPE, President, Manchester.
S. R. SWEETSER, Cumberland Centre, } Vice-Presidents.
D. J. BRIGGS, South Turner,
SAMUEL L. BOARDMAN, Secretary, Augusta.
D. H KNOWLTON, Treasurer, Farmington.

MINNESOTA STATE HORTICULTURAL SOCIETY.

WYMAN ELLIOTT, President, Minneapolis.
A. W. SIAS, First Vice-President, Rochester.
G. W. FULLER, Second Vice-President, Litchfield.
S. D. HILLMAN, Secretary, Minneapolis.
J. T. GRIMES, Treasurer, Minneapolis.

MISSISSIPPI HORTICULTURAL SOCIETY.

DR. H. E. MCKAY, President, Madison Station.
C. W. GALLAGHER, Vice-President, Meridian.
S. H. STACKHOUSE, Secretary, Crystal Springs.
J. D. SIDWAY, Treasurer, Jackson.

MICHIGAN STATE HORTICULTURAL SOCIETY.

T. T. LYON, President, South Haven.
W. K. GIBSON, First Vice-President, Jackson.
CHARLES W. GARFIELD, Secretary, Grand Rapids.
S. M. PEARSALL, Treasurer, Grand Rapids.
T. H. FORSTER, Librarian, Lansing.

MISSOURI STATE HORTICULTURAL SOCIETY.

J. C. EVANS, President, Harlem.
N. F. MURRY, Vice-President, Elm Grove.
L. A. GOODMAN, Secretary, Westport.
D. S. HOLMAN, Treasurer, Springfield.

NORTH CAROLINA FRUIT GROWERS' ASSOCIATION.

J. VAN. LINDLEY, President, Pomona.
T. CHAPMAN, First Vice-President, Manson.
S. O. WILSON, Secretary, Raleigh.
J. A. LINEBACK, Treasurer, Salem.

NEBRASKA HORTICULTURAL SOCIETY.

SAMUEL BARNARD, President, Table Rock.
J. H. MASTERS, First Vice-President, Nebraska City.
Miss M. A. STRATTON, Second Vice-President, Lincoln.
J. T. ALLAN, Secretary, Omaha.

NEW JERSEY STATE HORTICULTURAL SOCIETY.

A. W. PEARSON, President, Vineland.
E. WILLIAMS, Recording Secretary, Montclair.
J. T. LOVETT, Corresponding Secretary, Little Silver.
CHARLES L. JONES, Treasurer, Newark.

OHIO HORTICULTURAL SOCIETY.

N. OHMER, President, Dayton.
H. Y. BEEBE, Vice-President, Ravenna.
GEORGE W. CAMPBELL, Secretary, Delaware.
LEO WELTZ, Treasurer, Wilmington.

STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA.

CALVIN COOPER, President, Bird in Hand.
E. B. ENGLE, Secretary, Waynesboro.
GEORGE B. THOMAS, Treasurer, West Chester.
GABRIEL HIESTER, Librarian, Harrisburg.

SOUTH CAROLINA HORTICULTURAL SOCIETY.

R. M. SIMS, President, Columbia.
W. C. CLARK, Secretary.

TEXAS STATE HORTICULTURAL SOCIETY.

T. V. MUNSON, President, Denison.
GILBERT ONDERDONK, Vice-President, Nursery.
MRS. J. R. JOHNSON, Secretary, Dallas.
J. S. KERR, Treasurer, Sherman.

TEXAS STATE NURSERYMEN'S ASSOCIATION.

E. W. KIRKPATRICK, President, McKinney.
J. W. BRICE, Vice-President, Terrell.
J. M. HOWELL, Secretary and Treasurer, Dallas.

WISCONSIN HORTICULTURAL SOCIETY.

J. M. SMITH, President, Green Bay.
J. S. STICKNEY, Vice-President, Wauwatosa.
H. C. ADAMS, Secretary, Madison.
B. S. HOXIE, Corresponding Secretary, Evansville.
MATT. ANDERSON, Treasurer, Cross Plains.

MISSOURI VALLEY HORTICULTURAL SOCIETY.

J. C. EVANS, President, Harlem, Missouri.
E. TAYLOR, Vice-President, Edwardsville, Kansas.
F. HOLSINGER, Secretary, Rosedale, Kansas.
G. F. ESPENLAUB, Treasurer, Rosedale, Kansas.

GREEN COUNTY (MISSOURI) HORTICULTURAL SOCIETY.

W. E. SHEFFIELD, President, Springfield.
J. KIRSHGRABER, Vice-President, Springfield.
D. S. HOLMAN, Secretary, Springfield.
R. W. MECHAM, Treasurer, Springfield.

HOLT COUNTY (MISSOURI) HORTICULTURAL SOCIETY.

N. F. MURRY, President, Elm Grove.
J. N. MENIFEE, Vice-President, Oregon.
W. R. LAUGHLIN, Secretary, Elm Grove.
C. NOBLITGILL, Treasurer, Oregon.

LAFAYETTE COUNTY (MISSOURI) HORTICULTURAL SOCIETY.

DR. W. A. GORDON, President, Lexington.
U. G. PHETZING, Vice-President, Lexington.
C. TEUBNER, Secretary, Lexington.
G. M. CARTON, Treasurer, Lexington.

CENTRAL MISSOURI HORTICULTURAL SOCIETY.

H. M. MYERS, President, Boonville.
R. T. KINGSBURY, Vice-President, Estill.
C. C. BELL, Secretary, Boonville.
W. P. THOMPKINS, Treasurer, Boonville.

MONTGOMERY COUNTY (MISSOURI) HORTICULTURAL SOCIETY.

R. H. MANSFIELD, President, Montgomery City.
F. LIONBERGER, Secretary, New Florence.
F. GENTMAN, Treasurer, New Florence.

JASPER COUNTY (MISSOURI) HORTICULTURAL SOCIETY.

BENNETT HALL, President, Carthage.
M. I. PARKER, Vice-President, Carthage.
Z. T. RUSSELL, Secretary and Treasurer, Carthage.

BATES COUNTY (MISSOURI) HORTICULTURAL SOCIETY.

C. J. ROBERTS, President, Butler.
J. B. DURAND, Vice-President, Prairie City.
HENRY SPEER, Secretary and Treasurer, Butler.

WEST TENNESSEE HORTICULTURAL SOCIETY.

C. M. MERWIN, President, Medina.
C. J. BELL, Secretary, Kenton.
W. R. REA, Treasurer, Humboldt.

NORTH COLORADO HORTICULTURAL SOCIETY.

J. S. MCCLELLAND, President, Fort Collins.
J. E. WASHBURN, Secretary, Loveland.
S. H. DICKSON, Treasurer, Laymont.

WESTERN NEW YORK HORTICULTURAL SOCIETY.

PATRICK BARRY, President, Rochester.
W. C. BARRY, Rochester, } Vice-Presidents.
S. D. WILLARD, Geneva, } Vice-Presidents.
W. BROWN SMITH, Syracuse, } Vice-Presidents.
J. S. WOODWARD, Lockport, } Vice-Presidents.
P. C. REYNOLDS, Secretary and Treasurer, Rochester.

WESTERN IOWA HORTICULTURAL SOCIETY.

L. A. WILLIAMS, President, Glenwood.
F. W. TAYLOR, Vice-President, Creston.
GEORGE VAN HOUTON, Secretary, Lenox.

NEW ORLEANS HORTICULTURAL SOCIETY.

E. BAKER, President, New Orleans.
R. MAITRE, Vice-President, New Orleans.
H. A. DESPOMMIER, Secretary, New Orleans.
J. H. MENARD, Corresponding Secretary, New Orleans.
J. EBLIN, Treasurer, New Orleans.

HORTICULTURAL SOCIETY OF NORTHERN ILLINOIS.

D. WILMOT SCOTT, President, Galena.
LEN. SMALL, Vice-President, Kankakee.
E. W. GRAVES, Recording Secretary, Sandwich.
D. WILMOT SCOTT, Corresponding Secretary, Galena.
L. WOODWARD, Treasurer, Marengo.

HORTICULTURAL SOCIETY OF CENTRAL ILLINOIS.

Prof. T. J. BURRILL, President, Champaign.
C. N. DENNIS, Vice-President, Hamilton.
A. C. HAMMOND, Secretary, Warsaw.
CHARLES C. HOPPE, Treasurer, Warsaw.

ALTON—SOUTHERN ILLINOIS HORTICULTURAL SOCIETY.

J. S. BROWN, President, Alton.
THEO. GOODRICH, Vice-President, Cobden.
E. A. RIEHL, Secretary, Alton.
S. F. CONNOR, Treasurer, Alton.

WARSAW (ILLINOIS) HORTICULTURAL SOCIETY.

C. N. DENNIS, President, Hamilton.
A. C. HAMMOND, Vice-President, Warsaw.
J. T. JOHNSON, Secretary, Warsaw.
C. C. HOPPE, Treasurer, Warsaw.

BERKS COUNTY (PENNSYLVANIA) HORTICULTURAL SOCIETY.

JAMES MCGOWAN, President, Geiger's Mills.
GEORGE D. STITZEL, Vice-President, Reading.
CYRUS T. FOX, Secretary, Reading.
WILLIAM S. RITTER, Treasurer, Reading.

CENTRAL TEXAS HORTICULTURAL SOCIETY.

Col. W. G. VEAL, President, Dallas.
J. W. BRICE, Vice-President, Terrell.
Mrs. J. R. JOHNSON, Secretary, Dallas.
J. M. HOWELL, Treasurer, Dallas.

NORTH TEXAS HORTICULTURAL SOCIETY.

T. V. MUNSON, President, Denison.
JAS. NIMON, Vice-President, Denison.
J. J. FAIRBANKS, Secretary and Treasurer, Denison.

MONTICELLO (VIRGINIA) GRAPE AND FRUIT-GROWERS' ASSOCIATION.

HENRY L. LYMAN, President, Charlottesville.
H. M. MAGRUDER, First Vice-President, Eastham.
A. L. HOLLADAY, Second Vice-President, Eastham.
M. KAUFMAN, Treasurer, Charlottesville.
O. REIERSON, Corresponding Secretary, Charlottesville.
J. WEARMOUTH, Recording Secretary, University of Virginia.

NORFOLK (VIRGINIA) HORTICULTURAL AND POMOLOGICAL SOCIETY.

G. F. B. LEIGHTON, President, Norfolk.
Gen. R. L. PAGE, Vice-President, Norfolk.
Col. J. RICHARD LEWELLEN, Secretary, Norfolk.
Capt. JOS. B. SPRALLEY, Treasurer, Norfolk.

WESTERN MICHIGAN FRUIT GROWERS' SOCIETY.

WALTER PHILLIPS, President, Grand Haven.
A. J. KNISLEY, Secretary, Benton Harbor.
J. O. ANTISDALE, Treasurer, Muskegon.

HENNEPIN COUNTY (MINNESOTA) HORTICULTURAL AND GARDENERS' ASSOCIATION.

M. PEARCE, President, Minneapolis.
Dr. L. ASIRE, Secretary, Minneapolis.
WILLIAM LYONS, Treasurer, Minneapolis.

LEAVENWORTH COUNTY (KANSAS) HORTICULTURAL SOCIETY.

E. J. HOLMAN, President, Leavenworth.
Prof. L. HAWN, Vice-President, Leavenworth.
ANNA BOWMAN, Secretary, Leavenworth.
FRED. EASON, Treasurer, Lansing.

COWLEY COUNTY (KANSAS) HORTICULTURAL SOCIETY.

J. F. MARTIN, President, Winfield.
JACOB NIXON, Secretary, Kellogg.
GEO. W. ROBINSON, Treasurer, Winfield.

SOUTHERN ULSTER COUNTY (NEW YORK) HORTICULTURAL SOCIETY.

J. J. HULL, President, Clintondale.
W. C. CAYWOOD, Secretary, Marlboro.
D. H. MERRITT, Treasurer, Highland.

EASTERN CUYAHOGA (OHIO) HORTICULTURAL SOCIETY.

E. H. CUSHMAN, President, Euclid.
H. AVERY, Vice-President, Euclid.
W. H. DILLIE, Secretary, Euclid.
MRS. NANCY MAXWELL, Treasurer, Euclid.
H. P. WINTERS, Euclid,
W. W. DILLIE, Euclid,
MISS CARRIE DUNHAM,
} Executive Committee.

SUMMIT COUNTY (OHIO) HORTICULTURAL SOCIETY.

H. A. SACKETT, President, Talmadge.
THOS. RHODES, Vice-President, Akron.
M. CRAWFORD, Secretary, Cuyahoga Falls.

MONTGOMERY COUNTY (OHIO) HORTICULTURAL SOCIETY.

N. OHMER, President, Dayton.
N. H. ALBAUGH, Vice-President, Tadmor.
WILLIAM RAMSEY, Secretary, Dayton.
JOHN EWING, Treasurer, Dayton.

PORTAGE COUNTY (OHIO) HORTICULTURAL SOCIETY.

HORACE Y. BEEBE, President, Ravenna.
R. S. ELKINS, Vice-President, Ravenna.
Rev. ANDREW WILSON, Secretary, Ravenna.
C. S. BARTLETT, Treasurer, Ravenna.

LAKE COUNTY (OHIO) HORTICULTURAL SOCIETY.

W. A. WHEELER, President, Perry.
H. C. CAMP, Vice-President, Concord.
H. G. TRYON, Secretary, Willoughby.
O. S. CROWL, Treasurer, Mentor.

COLUMBUS (OHIO) HORTICULTURAL SOCIETY.

J. M. WESTWATER, President, Columbus.
O. W. ALDRICH, Vice-President, Columbus.
W. S. DEVOL, Secretary, Columbus.
GEO. W. SINKS, Treasurer, Columbus.

MIAMI COUNTY (OHIO) HORTICULTURAL SOCIETY.

J. P. JOHNSON, President, Piqua.
W. L. PERRY, Secretary, Covington.
T. MUNGER, Treasurer, Covington.

MARION COUNTY (INDIANA) HORTICULTURAL SOCIETY.

FIELDING BEELER, President, Indianapolis.
MRS. CHANDLEE, Secretary, Indianapolis.
MRS. C. A. DANALLY, Treasurer, Indianapolis.

WAYNE COUNTY (INDIANA) HORTICULTURAL SOCIETY.

J. C. STEVENS, President, Centerville.
J. C. RATLIFF, Secretary, Richmond.
DANIEL BULLA, Treasurer, Richmond.

PLAINFIELD (INDIANA) HORTICULTURAL SOCIETY.

DANIEL COX, President, Cartersburg.
DR. ALLEN FURNAS, Vice-President, Danville.
MORDECAI CARTER, Secretary, Plainfield.

ABBOTTSFORD (QUEBEC) FRUIT GROWERS' ASSOCIATION.

N. C. FISK, President, Abbottsford.
CHARLES GIBB, Corresponding Secretary, Abbottsford.
ARTHUR N. FISK, Secretary and Treasurer, Abbottsford.

MONTREAL (QUEBEC) HORTICULTURAL SOCIETY.

T. STERRY HUNT, President, Montreal.
R. W. SHEPHERD, JR., Corresponding Secretary, Montreal.
HENRY S. EVANS, Secretary and Treasurer, Montreal.

NOVA SCOTIA FRUIT GROWERS' ASSOCIATION.

REV. J. R. HART, President, Bridgetown.
W. H. BLANCHARD, SEN., Vice-President, Windsor.
C. H. R. STARR, Secretary and Treasurer, Port Williams.

FRUIT GROWERS' ASSOCIATION OF ONTARIO.

ALEX. McD. ALLAN, President, Goderich.
W. E. WELLINGTON, Vice-President, Toronto.
L. WOOLONTON, Secretary and Treasurer, Grimsby.

SOUTHWEST ASSOCIATION OF FRUIT AND VEGETABLE EVAPORATORS.

DR. A. W. MCPHERSON, President, Springfield, Missouri.
W. L. MARTIN, Vice-President, Cassville, Missouri.
DR. J. F. SIMONDS, Secretary, Wedington, Arkansas.
J. S. CRIST, Treasurer, Springfield, Missouri.

AGRICULTURAL AND HORTICULTURAL PRESS

AGRICULTURIST, Racine, Wis. Monthly. Fifty cents per year. Circulation over 25,000. Published by the Wisconsin Agricultural Company.

AMERICAN GARDEN AND FLORAL CABINET, New York. Monthly. Illustrated. $1 per year. L. Valentine and E. H. Libby, Proprietors. E. H. Libby, Editor.

AMERICAN AGRICULTURIST, New York. Monthly. O. Judd Publishing Co., 751 Broadway.

CANADA HORTICULTURIST, St. Catharines. Monthly. D. W. Beadle, Editor. Published by the Fruit-Growers' Association of Ontario.

COLMAN'S RURAL WORLD, St. Louis, Mo. Thirty-eighth year. Weekly. $1 per annum. Liberal Horticultural Department. N. J. Colman, Prop.

COUNTRY GENTLEMAN, Albany, N. Y. Weekly. $2.50 per year. Devoted to Agriculture, Horticulture and Live Stock. Formerly Cultivator.

DRAINAGE AND FARM JOURNAL, Indianapolis, Ind. Monthly. Published by J. J. W. Billingsley & Son. $1 per year.

FARM AND HOME. The Phelps Publishing Co., Sprinfield, Mass. Semi-Monthly. Herbert Myrick, Editor. 50 cents per year. Large circulation.

FARM AND GARDEN, Philadelphia, Penn. Monthly. 50 cents per year. Child Bro's & Co., Publishers. Large circulation.

FARMERS' HOME JOURNAL, Louisville, Ky. Weekly. $1.50 per annum. Agriculture, Horticulture, Live Stock. Th. S. Kennedy, Hort. Editor.

FARMERS' REVIEW, Chicago, Ill. The business farmers' paper. Weekly. $1.50 per year. Best market reports. O. C. Gibbs, Editor.

FARM AND FIRESIDE, Springfield, O. Semi-Monthly. 50 cents per annum. Devoted to General Agriculture and Horticulture.

FARM JOURNAL, THE, Philadelphia and Chicago. Monthly. Fifty cents per year. Wilmer Atkinson, Editor and Proprietor, with efficient corps of helpers. Circulation immense. The cheapest and best.

FLORIDA DISPATCH, Jacksonville, Fla. Weekly. $2 per year. A. H. Manville, Editor. Devoted to Southern Agriculture and Horticulture.

FRUIT AND GRAPE GROWER, Charlottsville, Va. Monthly. $1 per year. H. L. Lyman, Horticultural Editor.

FRUIT GROWERS' JOURNAL, Cobden, Ill. Semi-Monthly. $1 per year. A. M. Du Bois, Editor. T. E. Goodrich, Editor Horticultural Department.

GREEN'S FRUIT-GROWER. C. A. Green, Editor, Rochester, N. Y. Illustrated Quarterly. 25 cents per annum.

HOME FARM, THE, Augusta, Maine. Weekly. $2 per year. Samuel L. Boardman, Editor. Horticultural department liberal.

HORTICULTURAL ART JOURNAL, Rochester, N. Y. An Illustrated Monthly. $3 per year. T. B. Jenkins, Editor. The only journal devoted to Horticultural Art.

INDIANA FARMER, Indianapolis, Ind. Published weekly by the Farmer Company. $1.50 per year. Liberal Horticultural Department.

INDUSTRIALIST, THE, Weekly. Published by the Kansas Agricultural College, Manhattan, Kansas. Fifty cents per year.

JOURNAL COLUMBUS (O.) HORTICULTURAL SOCIETY. Monthly. Specially devoted to the interests of the Society. Edited by W. S. Devol, Secretary.

JOURNAL OF AGRICULTURE. Phil. Chew, Proprietor, St. Louis, Mo. A weekly, eight-page Agricultural paper. $1.50 per year.

KANSAS FARMER, Topeka, Kan. Weekly. Devoted to Western Agriculture and Horticulture.

MAINE FARMER, Augusta, Me. Weekly.

NEBRASKA FARMER, Lincoln, Nebraska. Monthly. $1.50 per year. Heath & Seiler, Proprietors. Established in 1877.

NEW ENGLAND HOMESTEAD. Phelps Publishing Co., Springfield, Mass. Weekly. $2 per year. Herbert Myrick, Editor. Good advertising medium.

NORTHWESTERN FARMER AND DAIRYMAN, Portland, Oregon. Weekly. $1.50 per year.

ORCHARD AND GARDEN, Little Silver, New Jersey. J. T. Lovett, Proprietor. A Monthly Journal of Horticulture. Price fifty cents per year.

OUR COUNTRY HOME, Greenfield, Mass. Monthly. Fifty cents a year. Geo. R. Knapp, Editor. Bright, reliable, instructive.

OHIO FARMER, Cleveland, Ohio. Weekly. $1 per year. M J. Lawrence, Editor and Proprietor; M. E. Williams, Associate Editor.

PALMER'S MONTHLY AND NURSERYMAN'S TRADE JOURNAL, Kansas City, Mo. $1 per year. Devoted to general Horticulture. S. C. Palmer, Editor.

PACIFIC RURAL PRESS. Weekly. $3 per year. Dewey & Co., Publishers, No. 252 Market street, San Francisco, California. Leading Rural Journal.

POPULAR GARDENING AND FRUIT GROWING, Buffalo, N. Y. $1 per year. This paper now embraces, by purchase, *Purdy's Fruit Recorder*, *American Horticulturist*, *Floral World* and *Garden Review*.

PRAIRIE FARMER, Chicago, Illinois. Weekly. $1.50 per year. Published by the Prairie Farmer Company. Orange Judd, Editor-in-chief.

RURAL CALIFORNIAN, Los Angeles, California. Illustrated Monthly. $1.50 per year. Alles & Gardner, Editors and Proprietors.

RURAL HOME, Rochester, New York. A first class weekly for the Farm and Fireside. Only $1 a year, post-paid. Good advertising medium.

RURAL NEW YORKER, New York. Weekly. $2 per year. New fruits and experimental work a specialty. Conducted by E. S. Carman.

RURAL AND WORKMAN, Little Rock, Arkansas. Weekly. $2 per year. Devoted to Agriculture and Horticulture.

RURAL VERMONTER, Montpelier, Vermont. Weekly. $1.15 per annum. T. H. Hoskins, M. D., Horticultural Editor.

SOUTHERN CULTIVATOR, Atlanta, Georgia. Monthly. $1.50 per year. Oldest agricultural paper in the South. Good advertising medium.

TEXAS FARM AND RANCH, Dallas, Texas. Semi-monthly. $1 per year. J. M. Howell, Horticultural Editor.

WORLD, THE, New York. Weekly. $1 per annum. Large department devoted to Agriculture and Horticulture. L. C. Benedict, Agri. Editor.

WEEKLY PRESS, Philadelphia, Pa. S. W. Cor. Seventh and Chestnut streets. $1 per year. General Agriculture and Horticulture.

WESTERN AGRICULTURIST, Quincy, Illinois. Monthly. $1.10 per year. T. Butterworth, Publisher. Send for club rates.

WESTERN FARMER, Madison, Wisconsin. T. D. Plumb & Son, Publishers. J. C. Plumb, Editor Horticultural Department.

WINE AND FRUIT-GROWER, New York. Monthly. $1 per year. B. F. Clayton, Editor and Publisher. Devoted to Viticulture, Pomology, etc.

INDEX.

PAGE.

American Horticultural Society, Proceedings of 25
Absent Friends, letters from 26
Albaugh, N. H., remarks by 41, 45, 75, 88, 89, 94, 95, 98, 99
Address of Welcome, Mayor Gardener 52
Annual Address, President Earle's 53
American Fruit Culture, Growth of 58
Apples, committee on 80
Additional Papers 152
Allen, C. L., paper by—Profitable Horticulture 160
Appendix 209
American Horticultural Society, roster of officers 214
American Pomological Society, roster of officers 214
American Forestry Congress, roster of officers 214
American Association of Nurserymen, roster of officers 214
Arkansas Horticultural Society, roster of officers 215
Alton—Southern Illinois Horticultural Society, roster of officers 220
Abbottsford Fruit Growers' Association, roster of officers 223
Agricultural and Horticultural Press, directory of 225
Bush, Isador, letter from 29
Berckmans, P. J., letter from 29
Beadle, D. W., letter from 31
Benefits of Horticultural Organizations 55
Blackburn Plum 66
Boggs, George E., remarks by 74, 89, 99, 138
Burdock, a garden vegetable in Japan 77
Barnesville, Ohio, Strawberries 94
Bell, C. S., Jr., committee on 97
Bureau of Pomology, resolution on 113
Brighton Grape, remarks on 147
Bagging Grapes, discussion on 150
Brackett, G. C., paper by—Relative Hardiness 179
Banquet at Euclid 198
Boggs, George E., response by 203
Bates County Horticultural Society, roster of officers 219
Berks County Horticultural Society, roster of officers 221
Cassell, W. H., letter from 33

PAGE.
Carpenter, Charles, remarks by 39
Cushman, E. H., remarks by 40, 129, 147, 148, 149, 150
Campbell, George W., remarks by 43, 137, 138
Campbell, George W., motion by 63
Campbell, George W., committees on 63, 67, 80
Committee on President Earle's Address 63
Committees on Exhibitions, appointed 67
Colman, Hon. N. J., telegram from 67
Change of place of meetings 67
Claypole, Prof., remarks by 75, 88
Crawford, Matthew, remarks by 75, 97, 98, 99, 138, 148, 149, 150
Caywood, A. J., remarks by 75, 95, 96, 99, 100, 101, 113, 150
Committees on Exhibitions 80
Cook, W. N., committees on 80, 97
Cook, W. N., remarks by 75, 89, 112
Committee on Nominations 97
Campbell, George W., report by, on Grapes 104
Campbell, Mrs. Ella Grant, compliment to 106
Campbell, George W., report by, on President Earle's Address 107
Campbell, George W., resolution by 113
Comparative Rainfall, Russia and Iowa 124
Comparative Temperature, Russia and Iowa 124
Comparative Growth of Trees, Prof. Lazenby 128
Campbell, George W., paper by—Better Culture of Grape-vines 134
Corsa, W. P., paper by—Selling Fruit by Auction 145
Colorado Horticultural Society, roster of officers 215
California Horticultural Society, roster of officers 215
California State Board of Horticulture, roster of officers 215
California Fruit Union, roster of officers 215
Central Missouri Horticultural Society, roster of officers 219
Central Texas Horticultural Society, roster of officers 221
Cowley County Horticultural Society, roster of officers 222
Columbus Horticultural Society, roster of officers 223
Doppelmair, George G., letter from 31
Discussion on Grape Growing 39, 137
Denning, W., letter from 45
Daniels, George H., letters from 46, 47
Distribution of Horticultural Products 60
Division of Pomology 61
Drouth, protection against, paper on, by J. M. Smith 67
Drouth, discussion on 73
Discussion on Nut Culture 87
Discussion on Small Fruits 94, 97
Discussion on Horticultural Organizations 101
Division of Pomology, paper on, by H. E. Van Deman 109
Discussion on Mr. Van Deman's paper 111

PAGE.
Doppelmair, George G., paper by—Protecting Railroads from Snow 120
Distribution of Rainfall in Russia 125
Discussion on Forestry 129
Discussion on Mr. Harris' paper 133
Discussion on New Grapes 147
Duchess Grape, remarks on 148
Diseases of the Quince 160
Earle, President, remarks by 26, 39, 42, 43, 45, 76, 87, 89, 94, 96, 98, 106, 108, 112, 113, 130, 133, 137, 150
Evans, J. C., letter from 27
Exhibitions, committees on 80
Euclid, invitation to, accepted 80
Election of officers 106
Experiment Station Bill, full text of 117
Early Victor Grape, discussion on 148
Empire State Grape, discussion on 150
Experiments with fungus diseases 155
Excursion to Euclid 195
Eastern Cuyahoga Horticultural Society, roster of officers 222
Forestry, the work of 62
Ford, Frank, remarks by 75, 95, 96, 137, 139, 148
Fruit exhibition 82
Ford, Frank, motion by 106
Forestry, discussion on 129
Fruit Growing in the Northwest, paper on, by J. S. Harris 130
Fernow, B. E., views of 211
Fernow, B. E., letters from 211, 212
Fernow, B. E., circular from 212
Florida Horticultural Society, roster of officers 215
Fruit Growers' Association of Ontario, roster of officers 224
Gibb, Charles, letter from 31
Grape Growing, discussion on 39, 137
Green, C. A., remarks by 39, 40, 41, 63, 74, 94, 95, 99, 133, 147, 148, 149, 150, 151
Greiner, Tuisco, remarks by 41, 88, 89, 99
Gardener, Mayor, welcome address by 52
Greiner, Tuisco, committees on 64, 80, 97
Green, Charles A., paper by—Vegetable and Animal Kingdoms 64
Grapes, committee on 80
Greiner, Tuisco, paper by—Transplanting 82
Green, Prof. W. J., remarks by 97
Grape-vines, Better Culture of, paper on, by George W. Campbell 134
Green, C. A., response by 201
Green, C. A., resolution by 207
Garfield, C. W., views of 211
Georgia Horticultural Society, roster of officers 215
Green County Horticultural Society, roster of officers 218

PAGE.
Hammond, A. C., letter from 29
Husmann, Prof. George, letter from 30
Hilgard, Prof. E. W., letter from 30
Hudson, E. M., letter from 33
Howell, J. M., letter from 35
Husmann, Prof. George, paper by—Grape Growing in California 37
Hubbard, T. S., remarks by 40, 45, 103, 115, 138, 147, 148, 149, 150, 151
Hollister, E. T., remarks by 40, 89, 149
Hart, E. H., paper by—Notes from the Extreme South 48
Horticulture defined 56
Horticulture—Æsthetic and Economical Sides 56
Hollister, E. T., committees on 64, 97
Harrison, J. J., remarks by 74, 75, 147
Hubbard, T. S., committee on 80
Harrison, J. J., committee on 80
Horticultural Exhibition, remarks on 81
Hale, J. H., paper by—Small Fruits in New England 90
Horticultural Organizations, paper on, by J. G. Kingsbury 100
Horticultural Organizations, discussion on 101
Harrison, J. J., report by, on flowers 105
Harris, J. S., paper by—Fruit Growing in the Northwest 130
Hillman, S. D., remarks by 139, 148
Horticulture in Mississippi, paper on, Prof. McKay 139
Horticulture in the Mountains of the South, paper on, Dr. Hape 142
Hape, Dr. S., paper by—Horticulture in the Mountains of the South 142
Harmes, L., remarks by 149
Hammond, A. C., paper by—What and Where to Plant 182
Horticultural Association of Pennsylvania, roster of officers 218
Holt County Horticultural Society, roster of officers 219
Horticultural Society of Northern Illinois, roster of officers 220
Horticultural Society of Central Illinois, roster of officers 220
Hennepin County Horticultural Society, roster of officers 221
Indiana Horticultural Society, roster of officers 216
Illinois Horticultural Society, roster of officers 216
Iowa Horticultural Society, roster of officers 216
"Johnny Appleseed," reference to 51
Jefferson Grape, discussion on 148
Jessica Grape, discussion on 149
Jasper County Horticultural Society, roster of officers 219
Kimball, Frank A., letter from 30
Kendel, A. C., reference to 81
Kingsbury, J. G., paper by—Horticultural Organizations 100
Kimball, Frank A., paper by—Olive Culture 185
Kansas Horticultural Society, roster of officers 216
Kentucky Horticultural Society, roster of officers 216
Letters from Absent Friends 26

PAGE.
Lyon, T. T., letter from 29
Leighton, G. F. B., letter from 33
Lindley, J. Van, remarks by 42, 88, 99, 138, 149
Lawrence, M. J., letter from 47
Leavenworth, Frank H., committee on 63
Lindley, J. Van, committees on 63, 80, 97
Lazenby, Prof. W. R., remarks by 74, 97, 113, 129
Lazenby, Prof. W. R., committee on 80
Lovett, J. T., paper by—Nut Culture 85
Lucretia Dewberry, origin of 99
Lazenby, Prof. W. R., address by, on Forestry 128
Lazenby, Prof. W. R., response by 200
Little, John, response by 204
Lafayette County Horticultural Society, roster of officers 219
Leavenworth, Kansas, Horticultural Society, roster of officers 222
Lake County Horticultural Society, roster of officers 223
Munson, T. V., letters from 27, 28
Miller, F. C., remarks by 40, 41, 45, 66, 87, 89, 95, 98, 138
McKay, Dr. H. E., remarks by 41, 73, 89, 95, 129, 144
McKay, Prof. A. B., remarks by 41, 75, 100
Marketing Horticultural Products 60
McKay, Dr. H. E., committees on 63, 97
Mesler, W. P., committees on 64, 97
McKay, Prof. A. B., committee on 80
Markle, Mr., committee on 97
Myrick, Herbert, remarks by 98, 149
Myrick, Herbert, paper by—The Press and Horticulture 114
McKay, Prof., paper by—Horticulture in Mississippi 139
Moore's Early Grape, discussion on 148
Montefiore Grape, discussion on 149
Markle, Mr., remarks by 149
Massachusetts Horticultural Society, roster of officers 216
Maine Pomological Society, roster of officers 216
Minnesota Horticultural Society, roster of officers 217
Mississippi Horticultural Society, roster of officers 217
Michigan Horticultural Society, roster of officers 217
Missouri Horticultural Society, roster of officers 217
Missouri Valley Horticultural Society, roster of officers 218
Montgomery County, Missouri, Horticultural Society, roster of officers 219
Monticello, Va., Horticultural and Pomological Society, roster of officers 221
Montgomery County, Ohio, Horticultural Society, roster of officers 222
Marion County Horticultural Society, roster of officers 223
Miami County Horticultural Society, roster of officers 223
Montreal Horticultural Society, roster of officers 223
Notes from the Extreme South, by E. H. Hart 48
New Orleans, World's Exposition at 54

PAGE.
Nut Culture, paper on, by J. T. Lovett 85
Nomination of Officers, committee on 97
Notes by the Secretary. 105, 106, 108, 116, 120, 152
New Grapes, discussion on 147
Niagara Grape, discussion on 149
North Carolina Fruit Growers' Association, roster of officers 217
Nebraska Horticultural Society, roster of officers 217
New Jersey Horticultural Society, roster of officers 217
North Colorado Horticultural Society, roster of officers 219
New Orleans Horticultural Society, roster of officers 220
North Texas Horticultural Society, roster of officers 221
Norfolk Horticultural Society, roster of officers 221
Nova Scotia Fruit Growers' Association, roster of officers 224
Ohmer, N., remarks by 73, 94, 95, 134, 137
Ohmer, N., committees on 80, 97
Ohio Horticultural Society, its Co-operation 81
Ohmer, N., reports by 103, 104
Officers, election of 106
Orchard Rusts, paper on, Prof. A. B. Seymour 152
Olive Culture in California, paper on, Frank A. Kimball 185
Ohio Horticultural Society, roster of officers 218
Press representatives present 25
Penhallow, Prof. D. P., letter from 32
Past, Present and Future of Grape Growing in California, Prof. Husmann 37
Pomology, a Division of 61
Paper by C. A. Green, Vegetables and Animals 64
Pierce, L. B., committee on 67
Paper by J. M. Smith, Drouth and Culture 67
Pears, peaches and plums, committee on 80
Plants and flowers, committee on 80
Paper on Transplanting, Tuisco Greiner 82
Paper on Nut Culture, J. L. Lovett. 85
Pierce, L. B., remarks by 89, 95, 98, 138, 151
Paper on Small Fruits, J. H. Hale 90
Pratt, E. H., committee on 97
Paper on Horticultural Organizations, J. G. Kingsbury 100
Place of next meeting, report on 106
President's Address, report on 107
Paper on Division of Pomology, H. E. Van Deman 109
Press and Horticulture, paper on, Herbert Myrick 114
Protecting Railroads from Snow Drifts, paper on, G. Doppelmair 120
Paper on Fruit Growing in the Northwest, J. S. Harris 130
Paper on Horticulture in Mississippi, Prof. A. B. McKay 139
Paper on Horticulture in the South, Dr. S. Hape 142
Paper on Selling Fruit by Auction, W. P. Corsa 145
Pocklington Grape, discussion on 148

PAGE.
Poughkeepsie Red Grape, discussion on..... 150
Paper on Orchard Rusts, Prof. Seymour..... 152
Profitable Horticulture, paper on, C. L. Allen..... 160
Paper on Relative Hardiness, G. C. Brackett..... 179
Paper, What and Where to Plant, A. C. Hammond..... 182
Paper on Olive Culture, Frank A. Kimball..... 185
Propagation of the Olive..... 188
Pierce, L. B., response by..... 201
Portage County Horticultural Society, roster of officers..... 222
Plainfield Horticultural Society, roster of officers..... 223
Press directory, agricultural and horticultural..... 225
Report of the Secretary..... 36
Ragan, Secretary, remarks by.....39, 44, 45, 88, 102, 111, 129, 148
Railroads and the Society..... 44
Reynolds, P. C., committee on..... 80
Ragan, Secretary, committee on..... 97
Reynolds, P. C., remarks by.....100, 111
Report on pears on exhibition..... 103
Report on grapes on exhibition..... 104
Report on apples on exhibition..... 104
Report on peaches on exhibition..... 104
Report on flowers on exhibition..... 105
Ragan, Secretary, notes by.....105, 106, 108, 116, 120, 152
Report of Committee on Nominations..... 106
Resolution on Division of Pomology..... 113
Russian Forestry Stations..... 122
Rainfall in Russia and Iowa..... 124
Rainfall, distribution of, in Russia..... 125
Ragan, Secretary, response by..... 202
Ragan, Secretary, paper by—Unification of Horticultural Societies..... 211
Roster of Officers of Societies..... 214
Strong, W. C., letter from..... 28
Smith, A. J., letter from..... 47
Smith, J. M., paper by—Culture and Drouth..... 67
Smith, J. M., remarks by.....73, 74, 75, 87, 96, 97, 98, 99, 134, 138, 147, 150
Small Fruits, paper on, J. H. Hale..... 90
Small Fruits, discussion on.....94, 97
Strawberries at Barnesville..... 94
Smith, J. M, committee on..... 97
Smith, J. M., report by, on nominations..... 106
Selling Fruit by Auction, paper on, W. P. Corsa..... 145
Seymour, Prof. A. B., paper by—Orchard Rusts..... 152
Smith, J. M, response by..... 200
Strong, W. C., views of..... 211
Society of American Florists, roster of officers..... 215
South Carolina Horticultural Society, roster of officers..... 218

PAGE.
Southern Ulster County Horticultural Society, roster of officers..... 222
Summit County Horticultural Society, roster of officers..... 222
Southwestern Association of Fruit Evaporators, roster of officers..... 224
Tyron, J. H., remarks by..... 40
Tamari, Kizo, remarks by.....43, 44
Troop, Prof. J., committees on.....63, 80
Townshend, Prof., remarks by..... 76
Tamari, K., paper by—Vegetables in Japan..... 77
Transplanting, paper on, Tuisco Greiner..... 82
Temperature in Russia and Iowa, compared..... 124
Troop, Prof. J., remarks by..... 148
Tamari, Kizo, response by..... 206
Texas Horticultural Society, roster of officers..... 218
Texas State Nurserymen's Ass'n, roster of officers..... 218
Ulster Prolific Grape, discussion on..... 150
Unification of Horticultural Societies..... 211
Van Deman, H. E., remarks by.....42, 66, 88, 99, 103, 113, 138, 147, 149, 150
Van Deman, H. E., committees on.....63, 80, 97
Vegetables in Japan, paper on, K. Tamari..... 77
Van Deman, H. E., motion by..... 80
Van Deman, H. E., report by..... 104
Van Deman, H. E., paper by—Division of Pomology..... 109
Vergennes Grape, discussion on..... 148
Wilder, Hon. Marshall P., letter from..... 27
Willard, S. D., letter from..... 28
Williams, M. E., remarks by..... 89
Wyoming Red Grape, discussion on..... 148
What and Where Shall we Plant, paper on, A. C. Hammond..... 182
Welcome to Euclid..... 198
Webster, Rev. Mr., speech by..... 198
Watrous, C. L., views of..... 211
Wisconsin Horticultural Society, roster of officers..... 218
West Tennessee Horticultural Society, roster of officers..... 219
Western New York Horticultural Society, roster of officers..... 220
Western Iowa Horticultural Society, roster of officers..... 220
Warsaw Horticultural Society, roster of officers..... 220
West Michigan Fruit Growers' Association, roster of officers..... 221
Wayne County Horticultural Society, roster of officers..... 223

UNIVERSITY OF MICHIGAN
3 9015 06710 5257